BROWNFIELD SOLUTIONS LTD

ALDI STORES LTD

Ruthin Road, Wrexham

Desk Study Assessment Report

June 2015

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LC/C2917/5320 Rev A

BSL

PROJECT QUALITY CONTROL DATA SHEET

Site Name:	Ruthin Road, Wrexham
Report Title:	Desk Study Assessment Report
Report Number:	LC/C2917/5320 Rev A

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Revision	Date	Status
-	05 June 2015	Final
A	06 August 2015	Final

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DESK STUDY ASSESSMENT REPORT
at
RUTHIN ROAD, WREXHAM

1.0 INTRODUCTION

1.1 Objectives

1.1.1 This report describes a Desk Study Assessment carried out by Brownfield Solutions Limited (BSL) for Aldi Stores Limited as instructed by SWF Consulting Engineers on a site off Ruthin Road, Wrexham.

1.1.2 The objectives of the Desk Study Assessment were to determine the sites environmental setting and likely site conditions, highlighting potential areas of concern that may govern the sites redevelopment.

1.2 Proposed Development

1.2.1 The proposed development is commercial end use comprising a steel framed retail building and associated car park areas.

1.3 Previous Investigation

1.3.1 A Desk Study Assessment Report and Phase II Site investigation (Ref: R2059-R01 –v2) was carried by Smith Grant LLP Environmental Consultancy on behalf of Welsh Ambulance Service NHS Trust in January 2015. The investigation covered the south western portion of the site owned by the Ambulance Service. The northern and eastern portions of the site are council owned and were not included in the investigation. The findings of the previous investigation are summarised within this report.

1.4 Limitations

1.4.1 This Desk Study Assessment has been carried out based on information obtained from a number of areas, BSL have assumed that this information is correct.

1.4.2 There may be other conditions prevailing on the site which are outside the scope of work and have not been highlighted by this assessment and therefore not been taken into account by this report. Responsibility cannot be accepted for such site conditions not revealed by the assessment.

1.4.3 This report has been prepared for the sole use of the client. No other third parties may rely upon or reproduce the contents of this report without the written permission of Brownfield Solutions Ltd (BSL). If any unauthorised third party comes into possession of this report they rely on it at their own risk and BSL do not owe them any Duty of Care.

2.0 THE SITE

2.1 Location & Access

2.1.1 The site is approximately 1.1 hectares and is located to the north of Ruthin Road, approximately 750m to the south west of Wrexham Town Centre.

2.1.2 The site is centred on National Grid Reference 332444, 350126.

2.1.3 Access to the site is gained off Ruthin Road, which bounds the site to the South or via an access road which runs along the eastern site boundary before entering the site in the north.

2.2 Surrounding Land Use

2.2.1 The site is bordered by a Morrisons supermarket and petrol station to the east.

2.2.2 Wrexham hospital is present to the north of the site at a distance of circa 125m with council offices bordering the site to the west.

2.2.3 To the south of the site beyond Ruthin Road the primary land use is residential with a school present to the south west.

2.3 Site Description

2.3.1 A walkover survey was carried out on the site on the 5th June 2015. The main site features and potential issues identified during this survey are detailed below.

2.3.2 The site currently houses an ambulance depot which is located in the south west of the site. The ambulance depot is split into three areas including a maintenance workshop. Several waste oil drums and lubricants were present within the maintenance workshop with a waste oil tank located externally on the north of the building. Some staining was noted on the concrete near to the waste oil tank.

2.3.3 A large bunded diesel tank is present on the eastern side of the building. A filling point is present beneath the tank, with evidence of small spills on the concrete. Near to the above ground tank was evidence of a former UST with a fuel pressure gauge, breather pipe and several manholes present.

2.3.4 The east of the site is primarily occupied by soft landscaping with a slope present on the eastern boundary sloping downwards approximately 2m to the access road for the site.

2.3.5 An unoccupied building and associated hardstanding is present in the north of the site. A small slope is also present along the northern boundary sloping downwards off site to a cycle path.

2.3.6 An access road for ambulances is present in the south of the site with this road sloping down to the south. The southern site boundary is marked by a steep slope with Ruthin Road being at a lower elevation than the site.

2.3.8 A row of mature deciduous trees is present along the western site boundary.

2.3.7 Areas of concern are shown on the Pertinent Site Features and Potential Constraints Plan C2911/02.

3.0 ENVIRONMENTAL SETTING

3.1 Published Geology

3.1.1 The following publications of the British Geological Survey (BGS) were examined in respect of the geology underlying the site:

- 1:50,000 Scale Geological Sheet 121 - Wrexham, Solid Edition
- 1:50,000 Scale Geological Sheet 121 - Wrexham, Drift Edition

Superficial Deposits

3.1.2 The site is indicated to be underlain by Quaternary glaciofluvial sheet deposits. This strata typically comprises sands and gravels with clays and silts present locally.

3.1.3 Alluvial deposits associated with the River Gwenfro are shown to the north of the site and may encroach onto the north western corner of the site.

3.1.4 Quaternary deposits of glacial till typically comprising sandy gravelly clays are anticipated to be present beneath the glaciofluvial sheet deposits, based on nearby deposits and the topography of the area.

Solid Geology

3.1.5 The deeper solid geology underlying the superficial deposits is the Etruria Formation which forms part of the Pennine Upper Coal Measures and primarily consists of Mudstone.

3.1.6 No coal seams are shown to subcrop on or in the vicinity of the site.

3.1.6 A fault is shown approximately 800m to the east of the site running in a north west to south east direction. The fault defines the boundary between the Etruria Formation and the Salop Formation to the east.

3.1.7 Any movement associated with this fault is likely to have ceased and reactivation of the fault is considered unlikely.

3.2 Hydrogeology

3.2.1 The superficial deposits in this area are classified by the Environment Agency as a Secondary A Aquifer 'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow for rivers'.

3.2.2 The bedrock is also classified as a Secondary A Aquifer.

3.2.3 The site is not indicated to lie within 500m of a Source Protection Zone (SPZ).

3.2.4 There are no groundwater abstraction licences within 500m of the site.

3.2.5 There are no potable water abstraction licences with 1500m of the site.

3.3 Hydrology

3.3.1 The nearest named watercourse to the site is the River Gwenfro, which lies 55m to the north west of the site and is classified as a Primary River.

3.3.2 Information obtained from the Environment Agency indicates that the site will not be affected by an extreme flood event.

3.3.3 There are two surface water abstraction licences within 500m of the site. The nearest of these is located 67m to the west of the site and pertains to the spray irrigation taken from the River Gwenfro.

3.3.4 There are no current licenced discharge consents within 250m of the site. There are three historical discharge consents with the nearest located 79m to the west of the site, licenced to Ambulance HQ and Council Offices for the discharge of an unspecified effluent type. The licence was revoked in 1992.

3.4 Historical Setting

3.4.1 Information has been obtained from historical Ordnance Survey Maps with the pertinent issues that may have affected the site or its environs summarised below.

3.4.2 The following plans produced by the Ordnance Survey were examined.

Scale	Date
1:1250	1957, 1963, 1975, 1989, 1992, 1993, 1994
1:2500	1874, 1899, 1912, 1958
1:10000/10560	1872, 1898, 1910, 1938, 1949, 1964, 1977, 1980, 1985, 1992, 2002, 2010, 2014

<u>The Site</u>

3.4.3 The earliest map inspected that of 1874 indicates the site to be undeveloped and forming part of open fields.

3.4.4 There are no changes to the site between the maps of 1874 and 1949.

3.4.5 The map of 1957 shows a small building located on the western site boundary. The building is labelled as a ruin.

3.4.6 Between the maps of 1964 and 1975 the site is developed as an **Ambulance Depot** with the main building shown in the south of the site. A smaller building is shown in the north of the site. In the east of the site is a Weights and Measures office which extends off site. A **slope** is present along the southern site boundary sloping from the ambulance depot down onto Ruthin Road to the south. Three small buildings are shown intersecting the north eastern site boundary.

3.4.7 The map of 1992 shows the smaller building to the north of the ambulance depot as being Council offices. The weights and measures building in the east of the site is now shown as being a Trading Standards Office. The south east of the site shows a Highways Laboratory and associated car parking areas, however the building itself is located off the eastern site boundary.

3.4.8 There are no further changes to the site between 1992 and 2010.

3.4.9 The most recent map of 2014 shows the Trading Standards Office and Highways Laboratory to have been demolished with this area of the site being hardstanding and grassed area running along the eastern boundary. The three small buildings in the far north east are also no longer shown. The eastern site boundary is now defined by a road with a roundabout in the north providing access to the ambulance station.

Surrounding Area

3.4.10 The earliest map available of 1872 shows the site to be primarily surrounded by open fields. The northern site boundary is bounded by the **Wrexham and Minera Railway Line** which runs east to west with a **signal box** present on the northern site boundary. A railway junction is shown 100m to the east of the site which links the Wrexham and Minera Railway with the Chester railway which runs north to south. Ruthin Road is shown to bound the site to the south. A small residential development known as Offa Terrace is shown approximately 10m to the south east of the site. To the north west at an approximate distance of 60m is the River Gwenfro.

3.4.11 The map of 1899 shows the railway on the northern site boundary to have incorporated further tracks. A 'fever hospital' is shown approximately 250m to the north.

3.4.12 The 1910 map shows a large **engine shed** to be present 175m to the east of the site. A **well**, associated with the engine shed is shown circa 225m to the east.

3.4.13 By 1938 the hospital to the north of the site has expanded to include Plas Maelor Institution which is located approximately 100m from the northern site boundary. On subsequent maps the Hospital is labelled as Maelor General Hospital.

3.4.14 The map of 1957 shows allotment gardens located approximately 30m from the north western site boundary. To the east of the site at a distance of circa 75m are a series of adjoining buildings labelled as a **depot**. To the north east approximately 150m from the site is a **tank** and **inspection pits** linked to the engine shed. A further well is shown to 150m to the east of the site.

3.4.15 By 1963 the allotment gardens to the west of the site are no longer shown. Residential development has taken place to the south of the site at a distance of 10m. Bryn Offa Secondary School is also shown to the south west of the site at a distance of circa 60m. The wells associated with the engine shed are no longer shown.

3.4.16 Between 1963 and 1975 expansion of Maelor General Hospital takes place with hospital buildings shown abutting the railway tracks to the north approximately 40m from the site boundary. An **electricity substation** is shown approximately 60m to the east of the site. The depot to the east of the site is now labelled as a **Corporation Depot.**

3.4.17 The engine shed to the east of the site is no longer shown on the map of 1985. A factory has been constructed off the western site boundary with a water reservoir present 110m to the west of the site.

3.4.18 A weighbridge associated with the Highways Laboratory and Trading Standards Office is shown approximately 50m to the east of the site on the map of 1992. The Wrexham and Minera Railway is shown as being dismantled.

3.4.19 There are no changes to the surrounding area between the maps of 1992 and 2010. The map of 2010 shows the, Trading Standards Office, Highways Laboratory and Corporation Depot to have been redeveloped with this known to be the existing Morrisons Supermarket adjacent to the site.

3.4.20 The Historical Maps are presented in Appendix A.

3.5 Environmental Searches

3.5.1 A formal request was also been made to Wrexham County Borough Council Contaminated Land Department for information pertaining to the site this information is presented in Appendix B. A summary of the relevant findings is presented below:

- The department is unaware of any known environmental problems or land reclamation schemes which would affect the site.
- The authority may at some time have to consider the site under Part 2A due to the sites use as an ambulance station with fuel storage tanks located on site. Unfortunately the Council does not yet have a list of prioritised sites for inspection under Part 2A and therefore it is impossible to advise of a likely time when such an assessment would take place.
- It is not possible to state whether the site would be subject to a remedial notice either currently or in the future, as it has not been investigated and subsequently found to meet the legal definition of Contaminated Land as defined under Part 2A of the Environmental Protection Act, 1990.
- It is not anticipated that the site would be considered a special site.
- The department holds limited information as to historic land uses. Based on the information held there are no landfill sites within 250m of the site.
- The department is unaware of any pollution incidents having occurred on or in the vicinity of the site.

3.5.2 An Environmental Search has been conducted through Groundsure, which utilises British Geological Survey and Environment Agency databases. The full report can be found in Appendix C. Although a summary of the more relevant findings is presented below.

Landfill Searches

3.5.3 There are no registered or non-operational landfill sites within 500m of the site.

3.5.4 There are no historic landfill sites within 500m of the site.

Registered Waste Treatment/Transfer Sites

3.5.5 There is one registered waste treatment/transfer site within 500m of the site. This is located 361m to the east of the site and no further details are held.

Pollution Incidents

3.5.6 There are no recorded pollution incidents within 500m of the site.

Authorised Processes

3.5.7 There are no Part A(1) registered processes within 500m of the site.

3.5.8 There is one Part A(2)/B registered process within 500m of the site. This is located 50m to the east of the site and is licenced to Morrisons Petrol Filling Station.

3.5.9 There are two active Category 3 or 4 Radioactive Substances Authorisations within 250m of the site. Both of these are located 143m to the north west of the site at Wrexham Maelor Hospital and pertain to the disposal of radioactive waste.

3.6 Radon

3.6.1 Map 13 'Northern Welsh Marches and Liverpool' of BRE Report 211 'Radon – Guidance on protective measures for new dwellings' was inspected which defines areas which require radon protective measures. Wrexham is an area requiring full Radon precautions in foundations.

3.6.1 BRE Report 211 provides a general indication of which areas require radon protection, a site specific assessment should be carried out through UK Radon or BGS.

3.7 Coal Authority Search

3.7.1 The site lies in an area where the Law Society recommends a mining search be undertaken as the site could be affected by past or current mining.

3.7.2 Therefore a search was carried out with the Coal Authority, which is presented in Appendix D, the main findings of which are presented below.

Past Mining

3.7.3 The property is in the likely zone of influence from workings in 3 seams of coal at 240m to 340m depth, last worked in 1932.

3.7.4 Any ground movement from these workings should have now stopped.

Present Mining

3.7.5 The site not within the zone of influence of any present underground coal workings.

Future Mining

3.7.6 The property is not in an area where the Coal Authority are determining whether to grant a licence to remove coal by underground workings.

3.7.7 The property is not in an area likely to be affected at the surface by any planned underground workings.

3.7.8 Reserves of coal exist in the local area that may be worked in the future.

3.7.9 No notice of the risk of land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine Entries

3.7.10 There are no records of any mine entries on or within 20m of site boundary.

Coal Mining Geology

3.7.11 The Authority is not aware of any damage arising to geological faults or lines of weakness that have been affected by coal mining.

Opencast Coal Mining

3.7.12 The property is not in an area affected by past or present coal mining extracted by opencast methods. The property is also not in an area affected by a proposed opencast coal mine.

Subsidence

3.7.13 The Coal Authority has not received a damage notice or claim for the subject property or within 50m since 31 October 1994.

Mine Gas

3.7.14 There is no record of mine gas emission requiring action by the Coal Authority within the boundary of the property.

Withdrawal of Support

3.7.15 The property is in area for which notices of entitlement to withdraw support were published in 1974 and 1976.

3.7.16 The property is not in an area for which a notice has been given under section 41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

3.8 Boreholes

3.8.1 There are six boreholes records on or within 50m of the site. The holes were drilled on 18th January 1966 and believed to have been intrusive works for the Ambulance Depot.

3.8.2 Topsoil was recorded in all of the holes at the surface at depths of between 0.30m and 0.90m. Fill material was observed at one location.

3.8.3 The topsoil was underlain by interbedded sands and gravels and firm to stiff sandy clays. Silt bands were also recorded locally.

3.8.4 Within three of the holes the sand and gravel extended beyond the end of the boreholes at depths of between 3.60m and 7.50m.

3.8.5 Sand and gravel was not encountered in one hole with clay present to 5.00m. Within the remaining two exploratory holes clay was present beneath the sand and gravel between 3.40m and 3.80m bgl.

3.8.6 The BGS Borehole Logs are presented in Appendix E.

3.9 Previous Report Summary

3.9.1 A Desk Study Assessment Report and Phase II Site Investigation with factual and interpretive reporting was carried out by Smith Grant Partnership LLP Environmental Consultancy in January 2015 (Ref: R2059-R01-v2). The report was carried out on behalf of the Welsh Ambulance Services NHS Trust.

3.9.2 The report covered the part of the site that was owned by the NHS and not the entire site, the area covered can be found on the Pertinent Site Features Plan Drawing Ref: LC/C2917/02.

3.9.3 The full Smith Grant Report should be read in conjunction with this Desk Study Assessment however a summary of the relevant findings are presented below:

Desk Study Assessment

Previous Reports and Investigations

3.9.4 Several reports and letters both on site and off site were reviewed by SGP as part of the Desk Study Assessment. Within the Ambulance Depot, three documents relating to underground fuel storages tanks (USTs) were identified.

3.9.5 In October 2006 Prime Fueling Systems issued a statement relating to the issue of fuel loss on the site. An initial site investigation in June 2006 identified evidence of a possible fuel leak between an above ground storage tank and a fuel pump with diesel noted as "weeping through joints in the concrete forecourt".

3.9.6 Confirmation of the fuel leak was confirmed with two areas excavated and rubble being removed. In addition 1000l of diesel was removed from a manhole chamber of the UST.

3.9.7 Upon completion of the remedial works the trial pits were reinstated with clean gravel with sample wells installed. The wells were tested two months later and did not identify any fuel. The concrete was then reinstated and the site re-commissioned.

3.9.8 It was noted by SGP that the remediation of the fuel spillage was limited.

3.9.9 The Environment Agency issued a letter 27th June 2006 stating that the validation and removal of hydrocarbon impacted material should be carried out by a suitably qualified professional and in accordance with their recommendations. Copies of validation testing results along with a completion report at the site should be sent to the EA for approval.

3.9.10 The UST is believed to have been decommissioned in 2010 with the tank being foam filled by a Bacel hardfoam injection. A planning application for an above ground storage tank was approved by Wrexham Council in 2010.

Radon

3.9.11 A site specific Radon search was carried out by SGP via BGS. The report confirmed the site lies within an area where full radon precautionary measures are required for new buildings.

Preliminary Conceptual Site Model and Risk Assessment

3.9.12 SGP identified possible risks to site end users from metals, metalloids, asbestos, hydrocarbons/ and PAHs within made ground with a site investigation comprising shallow soil sampling recommended to quantify to risk.

3.9.13 In addition a possible risk from ground gases from made ground deposits, underlying coal measures and from VOCs from the known diesel leak or any solvent spills or leaks was also identified.

3.9.14 A likely risk from radon gas was presented in the CSM.

3.9.15 With regards to controlled waters it was considered unlikely by SGP that a risk to surface water was present from contaminants from the made ground due to the foul and surface water runoff sytems emptying into the mains supply and not directly discharging into the river which was 100m to the north of their site boundary. It was also noted that shallow groundwater was likely to be limited at the site.

3.9.16 A possible risk to groundwater was identified via vertical migration within the drift deposits depending on the nature of their composition.

Site Investigation

3.9.17 Eight window sample boreholes were drilled on 12th November 2014 to a maximum depth of 4.45m. SPT sampling was undertaken at 1m intervals within five of the window sample locations. The exploratory hole location plan provided within the report recorded the window samples as BH1-BH8, with the holes referenced as WS1-WS8 within the main body of the report and in the exploratory hole logs.

3.9.18 Gas and groundwater monitoring wells were installed in five of the exploratory holes.

Ground Conditions

3.9.19 Topsoil was encountered in three exploratory holes to a maximum depth of 0.50m.

3.9.20 With the exception of WS4 and WS6 minimal made ground was encountered. WS4 encountered sand and gravel to 1.10m which was used as clean backfill material for the diesel leakage of 2006. Within WS6 made ground was encountered to 1.00m and consisted of black ash, brick and cinder fill.

3.9.21 The natural ground conditions across the site consisted of silt sand and clay deposits comprising a stiff brown silt, yellow/brown fine to medium sand and a firm brown clay with variable amounts of gravel. The natural ground was encountered at depths of between 0.20m and 1.10m and was proven to a depth of 4.45m.

3.9.22 No bedrock was encountered during the investigation.

Observations

3.9.23 Within WS4 between 0.30m and 1.10m the gravel was observed as having a strong hydrocarbon odour which continued into the underlying natural clay to 3.00m. It was noted the hydrocarbon odour became fainter with depth and was described as faint between 3.00m and 4.00m.

3.9.24 Within WS3 a slight diesel odour within the fine sand below 1.00m was noted and continued into the clay, sand and silt strata to the borehole at 4.00m.

Groundwater

3.9.25 Groundwater was recorded between 3.00m and 4.00m within WS1 with all other locations being dry during the drilling.

3.9.26 Subsequent groundwater monitoring carried out as part of the gas monitoring programme recorded groundwater levels of between 0.15m and 1.10m.

Chemical Testing

3.9.27 Chemical analysis of the soils was carried out for metals, metalloids, PAHs, asbestos screening, hydrocarbons and/or BRE SD1. The results were screening against the relevant residential guideline values.

3.9.28 Generally concentrations of all contaminants were low. Within samples from WS3 and WS4 exceedances of hydrocarbons in the Aliphatic range C10-C12 were identified within natural soils with the higher fractions being below the screening criteria. All of the samples within WS3 and WS4 were identified as having the levels above the saturation limit and therefore having the potential to contain free phase hydrocarbons within all Aliphatic ranges.

3.9.29 Napthalene values above the relevant screening criteria was recorded within WS3.

3.9.30 WS4 was shown to have Aromatic hydrocarbons within bands C12-C16 and C16-C21 above residential screening guideline values.

3.9.31 Groundwater testing was undertaken on samples from WS1, WS3 and WS4 with concentrations of hydrocarbons being significantly in excess of drinking water standards. A strong hydrocarbon odour was noted in WS3 and WS4 during the water monitoring with a slight odour noted in WS1.

Gas Monitoring

3.9.32 Based on the monitoring undertaken by SGP no significant concentrations of ground gases were identified and as such no specific ground gas precautionary measures relating to carbon dioxide or methane are required at the site.

3.9.33 PID monitoring was carried out to assess for the presence of VOCs. Within WS3 and WS4 significant concentrations were recorded of 440ppm in WS3 and 140ppm in WS4 on one occasion.

Revised Conceptual Site Model and Risk Assessment

3.9.34 Following the findings of the site investigation the potential impact to human health from the identified contamination was identified as being possible. However, the risk could be mitigated by the implementation of hardstanding to prevent dermal contact from hydrocarbons. With regards to the presence of VOCs, hotspot removal of diesel contamination is recommended.

3.9.35 The site investigation identified a higher risk to controlled waters than was previously though particularly in regards to groundwater. The contamination is noted as being relatively localised however remediation is recommended to remove the remaining source of hydrocarbons and prevent contamination from reaching the Secondary A Aquifer.

3.9.36 Full radon precautionary measures are required.

Foundations

3.9.37 SGP recommended strip and pad footings to be suitable foundations 2.00m using an allowable bearing capacity of 100kN/m^2 for low rise developments at the site.

3.9.38 Ground bearing floor slabs should be appropriate across the majority of the site. However, it was noted that following the removal of the existing

ambulance station sub-structures may necessitate the use of suspended slabs.

4.0 PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT

4.1 Introduction

4.1.1 The risk posed by any contaminants in soil or groundwater will depend on the nature and level of the source, the probability of exposure occurring, the potential pollution pathway and the likely effects on the receptors.

4.1.2 A contaminant is defined as a substance that has the potential to cause harm, a risk is considered to exist if such a substance is present at sufficient concentrations to cause harm and if a pathway is present a receptor could be exposed to the contaminant.

4.1.3 The following sections discuss the identified potential on-site and off-site sources, and any pollution that could impact receptors associated with the proposed development. Pollution linkages are assessed which may represent a risk to human health and/or controlled water receptors from the information gained from the desk study searches. The assessment has been carried out on a qualitative basis and aims to produce a complete and comprehensive Preliminary Conceptual Site Model.

4.1.4 Three potential impacts exist for any given site and all three need to be considered in the qualitative risk assessment, these are:

- On- site impacts;
- The site impacting its surroundings;
- Off-site sources impacting the subject site.

4.2 Potential Contaminative Sources

<u>On-Site</u>

4.2.1 From the information obtained during the desk study three on site contaminative sources were identified which may affect the redevelopment of the site for commercial end use. These are processes associated with the Ambulance Depot maintenance area, above and below ground fuel tanks and made ground across the site and within slopes at the site boundary.

4.2.2 The site lies in an area requiring full Radon Precautionary Measures.

<u>Off-Site</u>

4.2.3 Off-site sources include Railway lands from the former Wrexham and Minera Railway which bounds the site to the north which includes multiple tracks, embankments, signal boxes and large engine shed. The shed is to the east of the site approximately 175m away with associated tanks and wells.

4.2.4 An electricity substation was historically present to the east of the site at a distance of 60m.

4.2.5 In addition a Petrol station was constructed within 50m of the site boundary in 2010.

Associated Contaminants

4.2.6 The contaminants commonly associated with the potential sources of contamination identified include metals, PAHs and asbestos associated with made ground materials.

4.2.7 Hydrocarbons from above and below ground fuel storage tanks are known to be present at the site and within soils based on the findings of a previous site investigation. In addition hydrocarbons will also be associated with the waste oil drums and tank on site and existing petrol station to the east of the site.

4.2.8 Ground gases and vapours associated with the hydrocarbons and made ground may also be present across the site.

4.2.9 Information obtained from the Department of the Environment Industry Profile for Railway Lands indicated the made ground associated with the former railway to the north which was dismantled in 1992 may include:

- PAHs from siding complexes or ash ballast
- Hydrocarbons
- Herbicides
- PCBs
- Asbestos
- Solvents
- Metals
- Sulphates

4.3 Pathways

4.3.1 A pathway is defined as a medium by which a contaminant comes into contact with, or otherwise impacts a receptor. Due to the sites proposed end use being commercial potential pollution pathways for contaminant migration at the site will exist.

4.3.2 At this stage the potential contaminants identified above are considered to present potential risks to site end users and controlled waters through the following pathways:

- Ingestion of contaminated soils
- Dermal contact with contamination
- Inhalation of gases or vapours in both indoor and outdoor air
- Direct contact by buried structures such as services pipes
- Surface run-off
- Leaching of mobile contamination into groundwater
- Migration of perched groundwater in any permeable soils or along existing or proposed service runs
- Saturated zone flow through the Secondary A Aquifer underlying the site

4.4 Receptors

4.4.1 Receptors generally fall into the categories of human health or controlled waters. The identified receptors are listed below.

- Site End Users
- Surface Waters – River Gwenfro
- Groundwater – Secondary A Aquifers within superficial deposits and bedrock.

4.4.2 Contaminants within the soil and groundwater could potentially attack the clean potable water supply pipe, the contaminants should be assessed to determine the correct pipe material and level of precautions.

4.5 Preliminary Site Conceptual Model

4.5.1 The information obtained in the previous sections has been used to compile a Preliminary CSM. The identified potential contaminants and receptors have been assessed in the table below as to whether a plausible source-pathway-receptor pollutant leakage for the proposed end use of the site exists. The risk classification has been estimated in accordance with information in Appendix F.

Human Health

4.5.2 The Preliminary CSM for human health is presented in the table below:

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
		ON-SITE			
Made Ground	Ingestion, direct contact, inhalation of dusts.	End-users	Low Likelihood to Unlikely	Medium	Moderate/Low
Fuel Tanks/ Waste Oil Drums	Ingestion, direct contact, inhalation of dusts.	End-users	Likely	Medium	Moderate
Radon Gas and vapours	Migration into confined spaces, inhalation of gases.	End-users	Likely	Severe	High
Ground Gases	Migration into confined spaces, inhalation of gases and vapours	End-users	Low Likelihood	Medium /Severe	Moderate/Low
		OFF-SITE			
Railway Lands	Ingestion, direct contact, inhalation of vapours/dusts.	End Users	Low likelihood to Unlikely	Medium	Moderate/Low
Petrol Station	Ingestion, direct contact, inhalation of vapours.	End Users	Unlikely	Medium	Low

Electricity Substation	Ingestion, direct contact, inhalation of dusts.	End-users	Unlikely	Medium	Low

Human Health Justification

4.5.3 The site has not previously been developed prior to its current use with significant made ground deposits not being identified during the site investigation carried out by SGP. However, this investigation was confined to the south west of the site in the immediate vicinity of the ambulance depot. There is therefore potential for made ground and its associated contaminants to be present particularly in the north of the site near to the former railway. Made ground may also exist within the slopes on the site boundaries. However, the site is predominantly covered in hardstanding and will continue to be so following redevelopment which will break the pathway to site end users. Therefore the risk is currently assessed as moderate to low until confirmed by a site intrusive investigation.

4.5.4 The previous site investigation identified hydrocarbons to be present within the made ground and the natural soils in the vicinity of the former UST. A leak was known to have occurred from the UST in 2006. Chemical testing undertaken during the SGP investigation did not identify concentrations to be above levels regarded as harmful to human health. However, hydrocarbon concentrations were in excess of the saturation limits meaning free phase hydrocarbons may be present and as a minimum these should be removed. The hydrocarbon contamination is located under hardstanding at present and will continue to be following development. Evidence of small spillages on the surface were observed in the vicinity of the above ground storage tank and waste oil tank during the site walkover. Therefore the risk is assessed as being moderate until confirmed by a site intrusive investigation.

4.5.5 The site is located in an area where full radon precautionary measures are required. In addition, PID readings in excess of 400ppm were recorded in WS3 during the site investigation carried out by SGP, indicating that vapours originating from the hydrocarbons in the soils are a risk to site end users. Precautionary measures will therefore be required for radon and also vapours if all of the impacted soils are not removed. The risk from vapours and from radon gas is considered to be high.

4.5.6 The risk from methane and carbon dioxide was considered to be low during the previous investigation but the monitoring was confined to the west of the site and did not address the risk in the north or east of the site. If a radon and vapour resistant membrane is installed. No additional monitoring of permanent gases is likely to be required subject to approval of Wrexham Council. If no vapour resistant membrane is installed after remediation of the hydrocarbon contamination it is recommended that further ground gas monitoring is carried out during any subsequent site investigations to further assess the risk from carbon dioxide and methane. The risk from carbon dioxide and methane is considered to be high to moderate at present.

4.5.7 The former railway to the north of the site was dismantled in the early 1990s. The railway lands in the east and the north were redeveloped in 2010 as part of the development of the neighbouring supermarket. Remediation of these areas is believed to have taken place at this time. Both of these areas sit at a lower level to the site and are primarily covered in hardstanding breaking the pathway from potential contaminants to site end users. However some soft landscaping does exist to the north of the site therefore the risk is currently considered to be low to moderate.

4.5.8 A petrol filling station is located within 50m of the eastern site boundary. The petrol station was constructed in 2010 and as such suitable housekeeping measures are expected to be in place. In addition the petrol station is located at a lower elevation from than the site therefore the risk from contamination is considered to be low.

Controlled Waters

4.5.9 The Preliminary CSM for controlled waters is presented in the table below:

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
Made Ground	Migration through groundwater or granular soils	Controlled waters	Low Likelihood	Medium	Low/Moderate
Fuel Tanks, Waste Oil Drums	Migration through groundwater or granular soils	Controlled waters	Very Likely/ Likely	Medium	Moderate/High

Controlled Waters Justification

4.5.10 The site is primarily underlain by clay and silt deposits however sands and gravels have also been recorded therefore there is potential for contaminants to migrate both off site towards the River Gwenfro and to migrate vertically into the Secondary A Aquifer below.

4.5.11 The previous investigation carried out in 2015 did not identify any concentrations of metals, metalloids or PAHs that would pose a risk to controlled waters, however the testing carried out did not assess the areas nearest to the River Gwenfro. Further testing is recommended as part of a subsequent site investigation to assess the risk from these contaminants on controlled waters. The risk is currently assessed as moderate to low.

4.5.12 Water monitoring and chemical testing undertaken by SGP identified concentrations of hydrocarbons above acceptable levels to be present within the three boreholes tested. Hydrocarbons are a mobile contamination with a hydrocarbon odour detected within natural soils at the site. It is recommended that further monitoring wells are installed to assess the extent of the hydrocarbon contamination and to assess the risk to controlled waters. The risk is currently assessed as high to moderate.

4.6 Remedial Options

4.6.1 Although at a very early stage, it would be prudent to allow for a cover system as a minimum within the limited soft landscaping areas on the site. The purpose of this be to break the pathway to site users in areas of soft landscaping and provide a growing medium. The site will generally be covered in hardstanding which will break the pathway across the majority of the site.

4.6.2 Further remedial works to remove hydrocarbon contamination are likely to be required in the vicinity of the UST. The extent should be confirmed by a site intrusive investigation. The purposed of hydrocarbon contamination will be to address the risk to human health from free phase contamination and hydrocarbon vapours and also to assess the risk to controlled waters.

4.6.3 A watching brief should be in place during the groundworks and construction phase. If any visual or olfactory evidence of contamination is noted, works should cease in that area and a specialist consulted for advice.

4.6.4 However, any remedial designs should be confirmed with the Wrexham Contaminated Land Department after investigations and subsequent bespoke remedial site design.

4.7 Ground Gas Risk Assessment

4.7.1 A potential on-site gas source for permanent gases has been identified from localised made ground and hydrocarbons. The preliminary CSM considers it to be a low to moderate risk to site end users.

4.7.2 In accordance with CIRIA C665 as set out in Appendix G of this report, the recommended gas monitoring should comprise 6 visits over a 3 month period.

4.7.3 As the site lies in an area requiring full radon precautionary measures a lot of the risk from ground gases will be mitigated by the installation and validation of appropriate measures.

4.7.4 It is therefore recommended that a review of the necessary gas monitoring programme is undertaken following the findings of a site intrusive investigation.

5.0 DEVELOPMENT CONSTRAINTS

5.1 Foundations

5.1.1 Traditional strip and pad foundations at a depth of 2.00m are likely to be suitable for the proposed commercial development. This should be confirmed by a site intrusive investigation within the footprint of the proposed building.

5.1.2 Ground bearing floor slabs may generally be adopted at the site, providing less than 600mm of suitably compacted granular material is present following development.

5.1.3 If a suspended floor slab is required then pads and a reinforced ring beam is likely to be a more suitable foundation solution.

5.1.4 Trees are present along the western site boundary therefore foundations encountering cohesive strata may need to be deepened in accordance with the necessary guidance.

5.1.5 This should be confirmed by on site intrusive investigations.

5.2 Other Constraints

5.2.1 Asbestos was not covered in this report. It should be noted that a demolition asbestos survey will need to be undertaken prior to the removal of existing buildings on site.

5.2.2 The site boundaries are defined by a series of slopes at various gradients. It is recommended that a slope assessment is undertaken to assess the impact of the slopes on the proposed development layout.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Environmental

6.1.1 The site was not developed until the 1960s until it became an ambulance depot in the south with council buildings present in the north and the east. The site has since remained largely unchanged, with the buildings in the east being demolished in 2010.

6.1.2 The risk to site end users is considered to be moderate to low from hydrocarbons, metals, PAHs and asbestos from both on and off site sources.

6.1.3 The risk from vapours and radon to site end users is considered to be high as the site is located within an area requiring full radon precautionary measures in addition to a previous site investigation identifying high concentrations of vapours associated with a historic below ground fuel leak on site.

6.1.4 The previous site investigation carried out by SGP in 2015 identified a high to moderate risk to controlled waters from the hydrocarbon leakage with levels of fuel derived fractions being far in excess of acceptable levels.

6.1.5 A site investigation to quantify the risk to site end users and controlled waters should be undertaken.

6.2 Geotechnical

6.2.1 Traditional strip and pad foundations at 2.00m with a ground bearing floor slab are likely to be appropriate for the proposed development.

6.2.2 If a suspended floor slab is required then pads and a reinforced ring beam may be a more cost effective foundation solution.

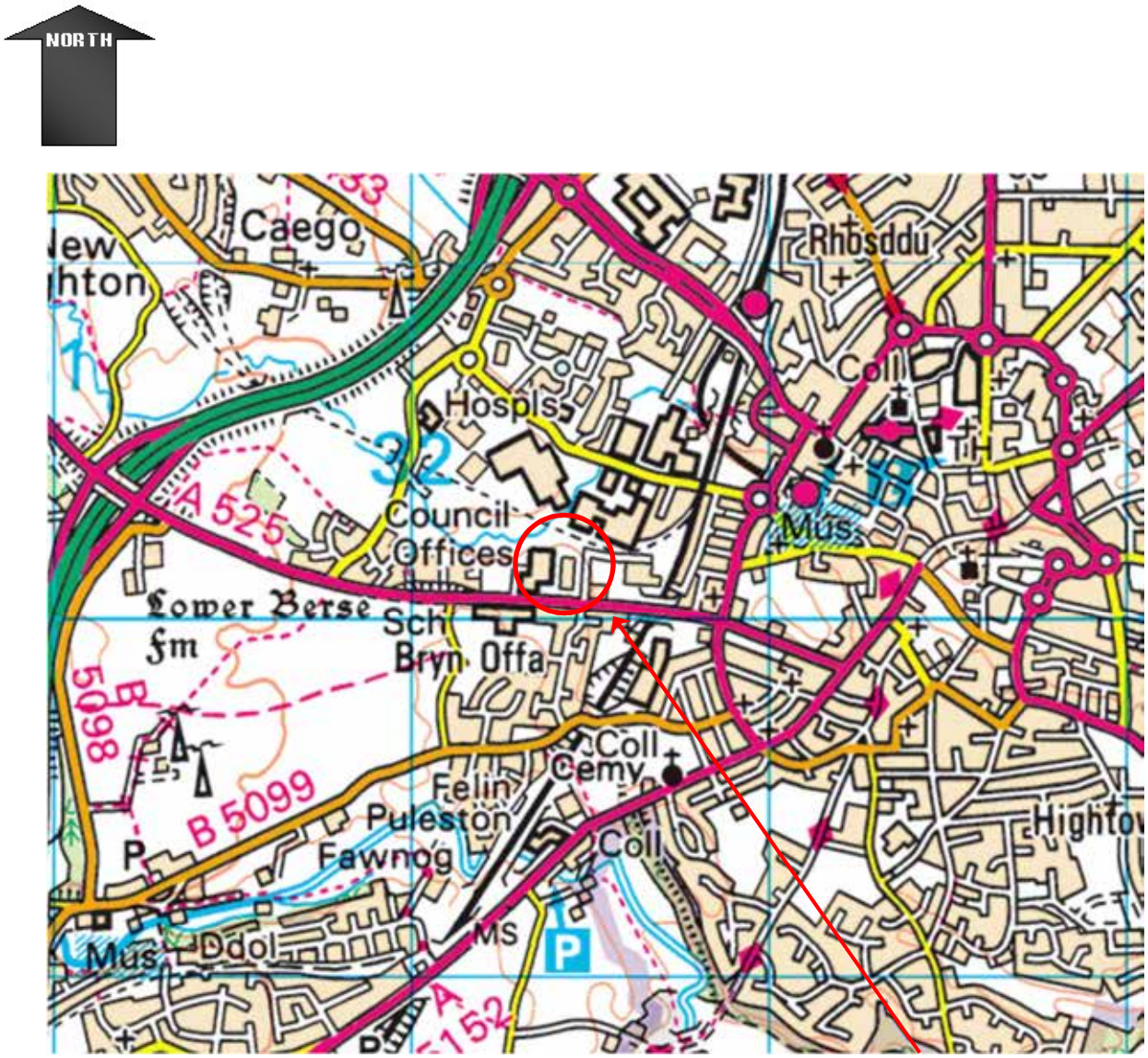
6.2.3 A slope assessment is recommended on the site boundaries to assess the impact of existing slopes on the proposed development layout.

6.3 Further Work

6.3.1 Therefore to allow future development of the site the following further works are recommended, although this list is not exhaustive and should be read in conjunction with any planning conditions that are applicable to the site.

- Intrusive site investigations comprising cable percussive boreholes and window sampling across the whole site.
- Slope Assessment.
- Investigation of below ground UST and surrounding soils.
- Groundwater and gas monitoring.
- Asbestos Demolition Survey within former council depot.
- Design of remedial strategy.
- Confirmation of Remedial Strategy with Local Authority

DRAWINGS



SITE

Brownfield Solutions Limited **BSL**

ALDI STORES LTD

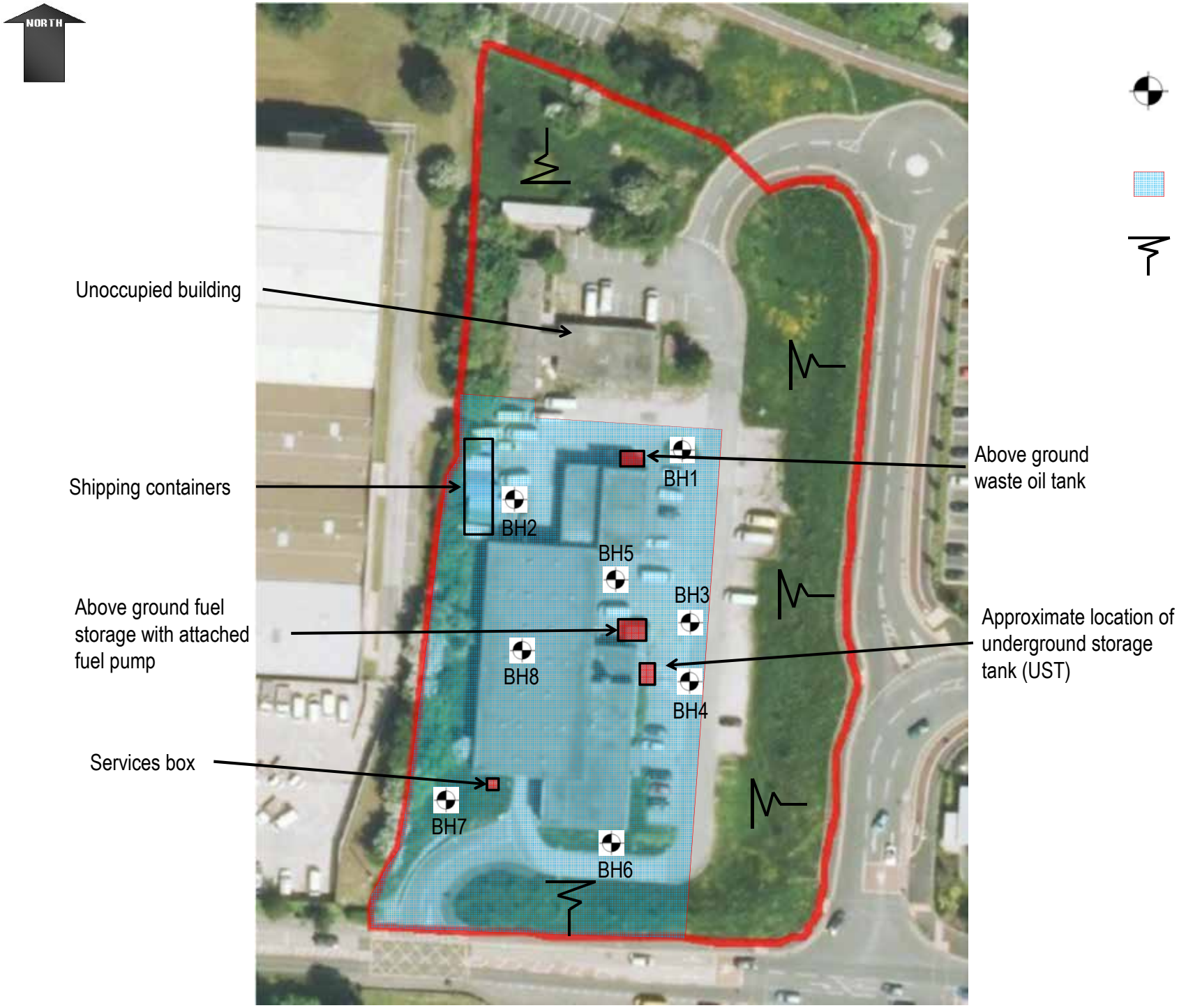
Ruthin Road, Wrexham

Site Location Plan

Drawing Number C2917/01

Scale: NTS

Drawn By: SF	Checked By: JD



KEY:

- SGP (2015) Borehole locations
- SGP (2015) Area of investigation
- Slope

Brownfield Solutions Limited BSL

ALDI STORES LTD

Ruthin Road, Wrexham

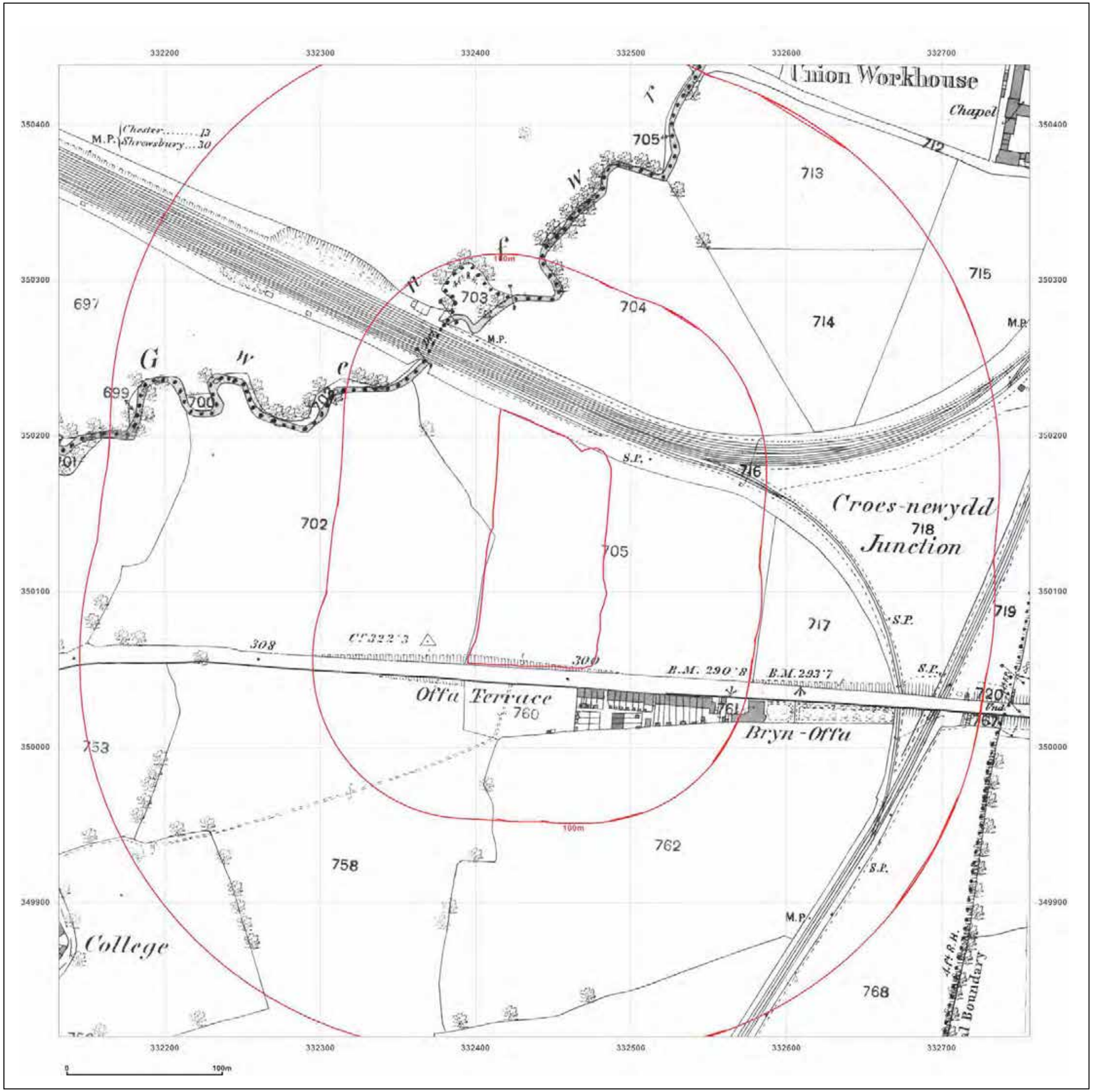
Pertinent Site Features Plan

Drawing No. C2917/02

Scale: NTS

Drawn By: SF | Checked By: JD

APPENDIX A
Historical Maps



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Site Details:

Wrexham,Ruthin Road

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Report Ref: EMS-306480_413779
Grid Ref: 332444, 350126

Map Name: County Series

Map date: **1874**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1874
Revised 1874
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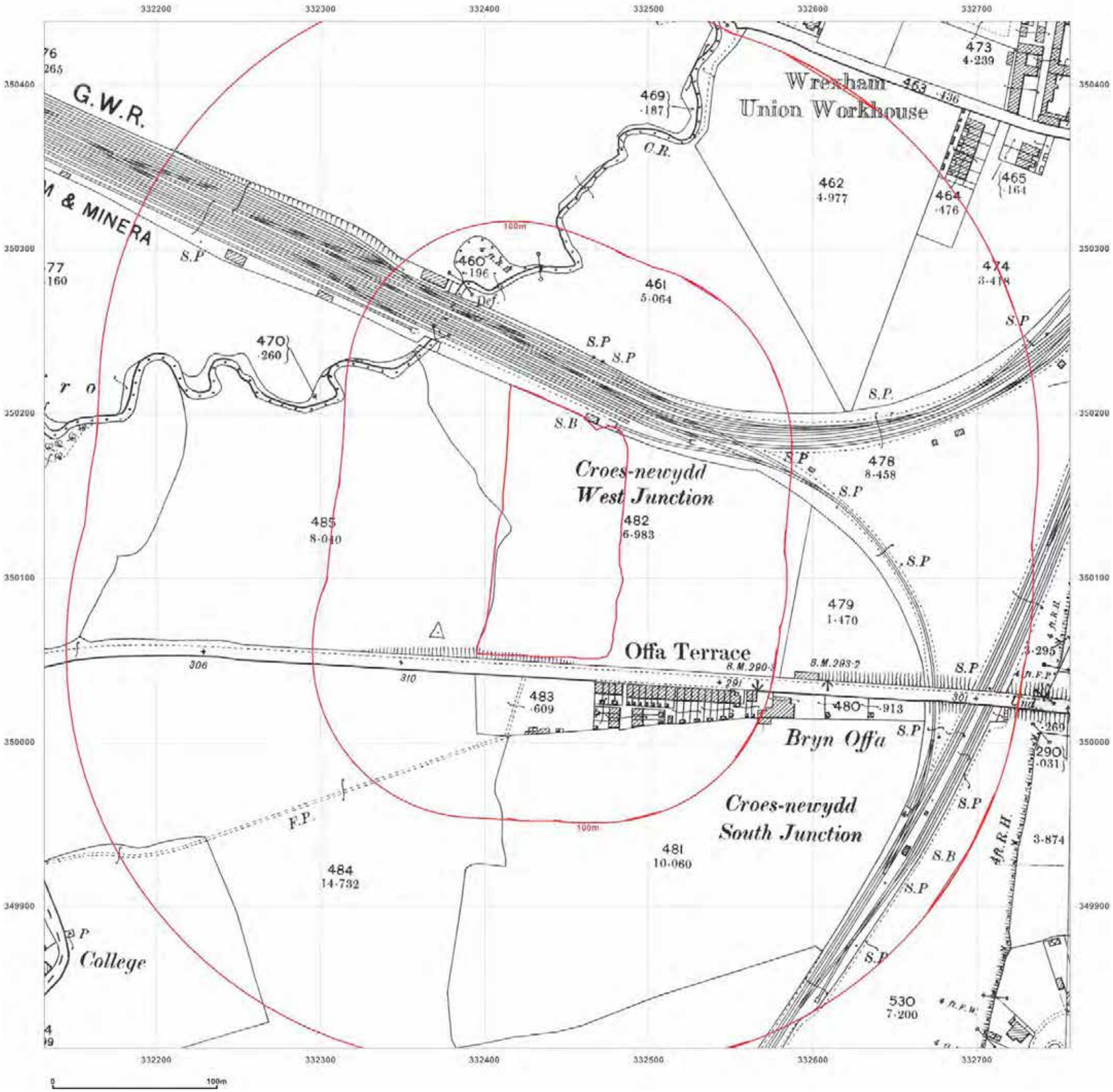

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Report Ref: EMS-306480_413779
Grid Ref: 332444, 350126

Map Name: County Series

Map date: **1899**

Scale: 1:2,500

Printed at: 1:2,500

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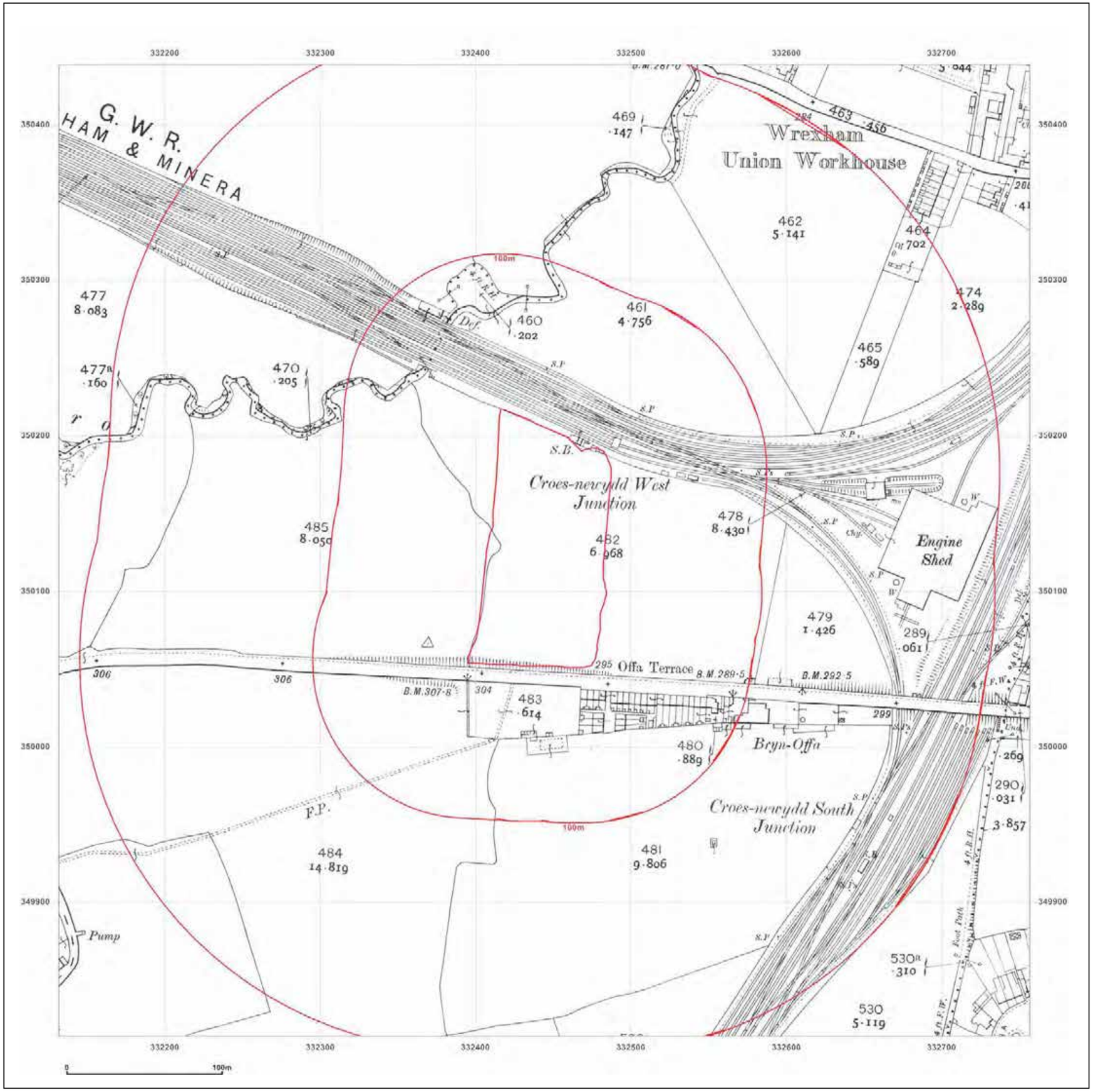

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Map Name: County Series

Map date: **1912**

Scale: 1:2,500

Printed at: 1:2,500

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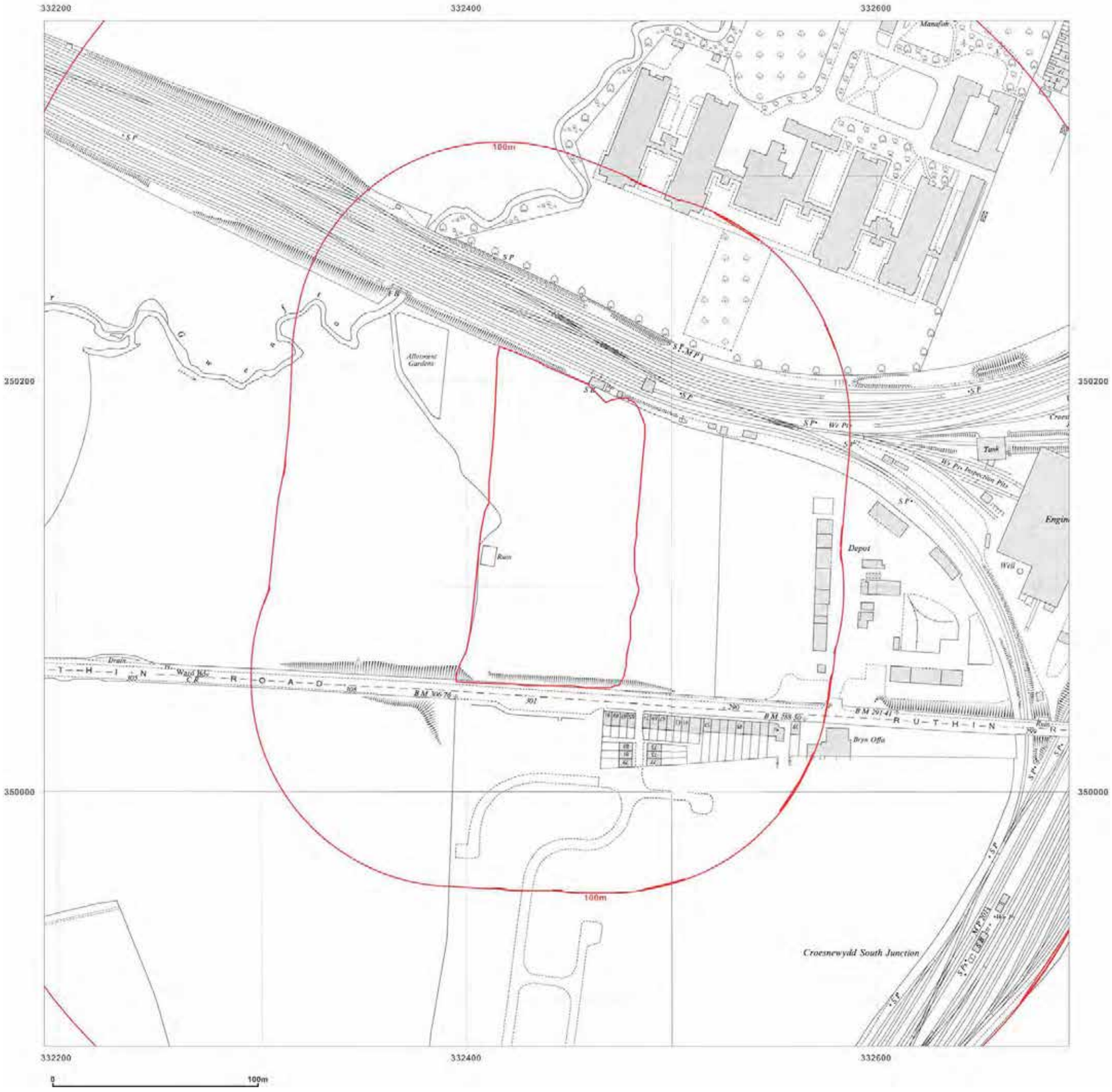

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Map Name: National Grid

Map date: **1957**

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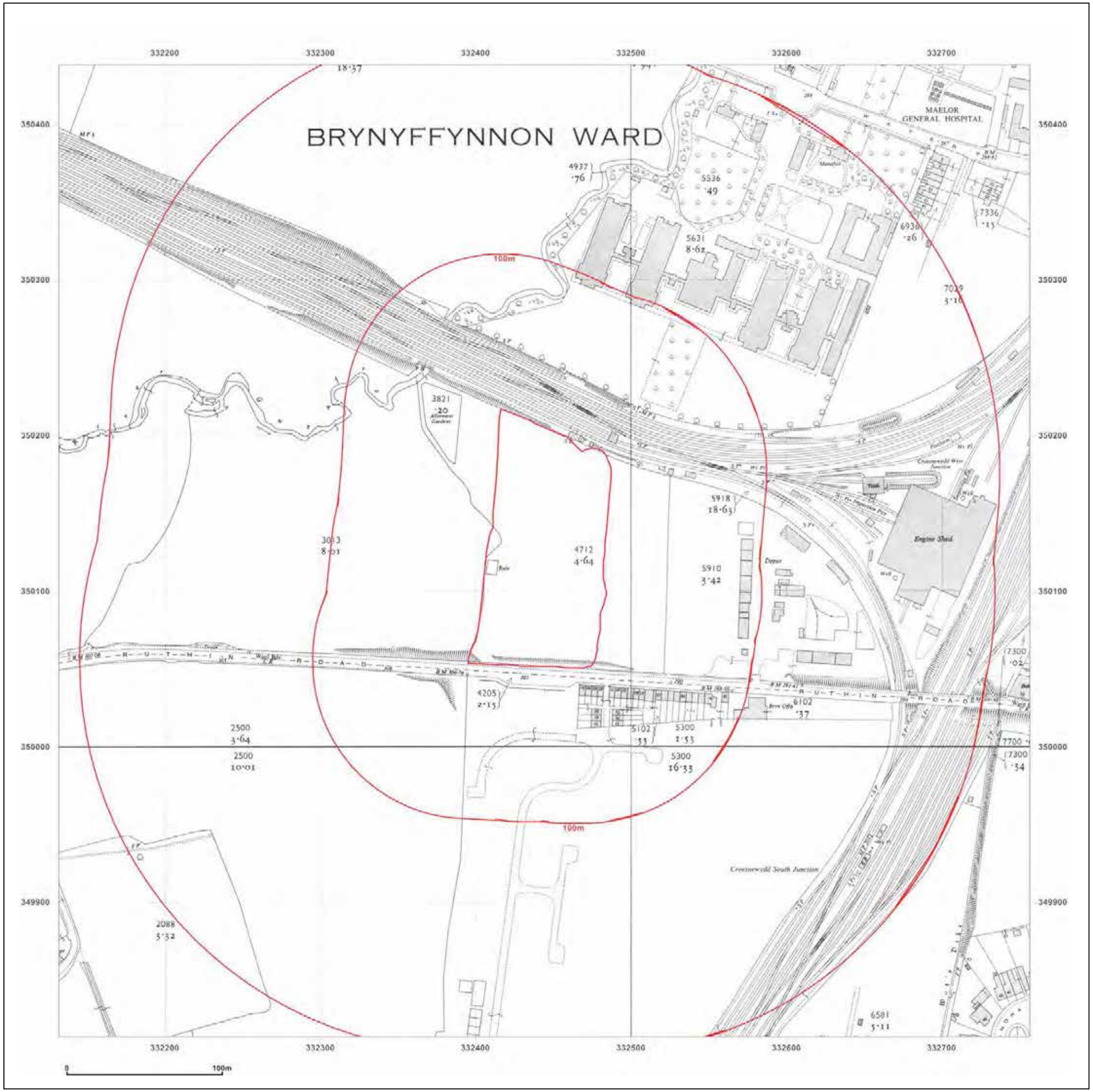

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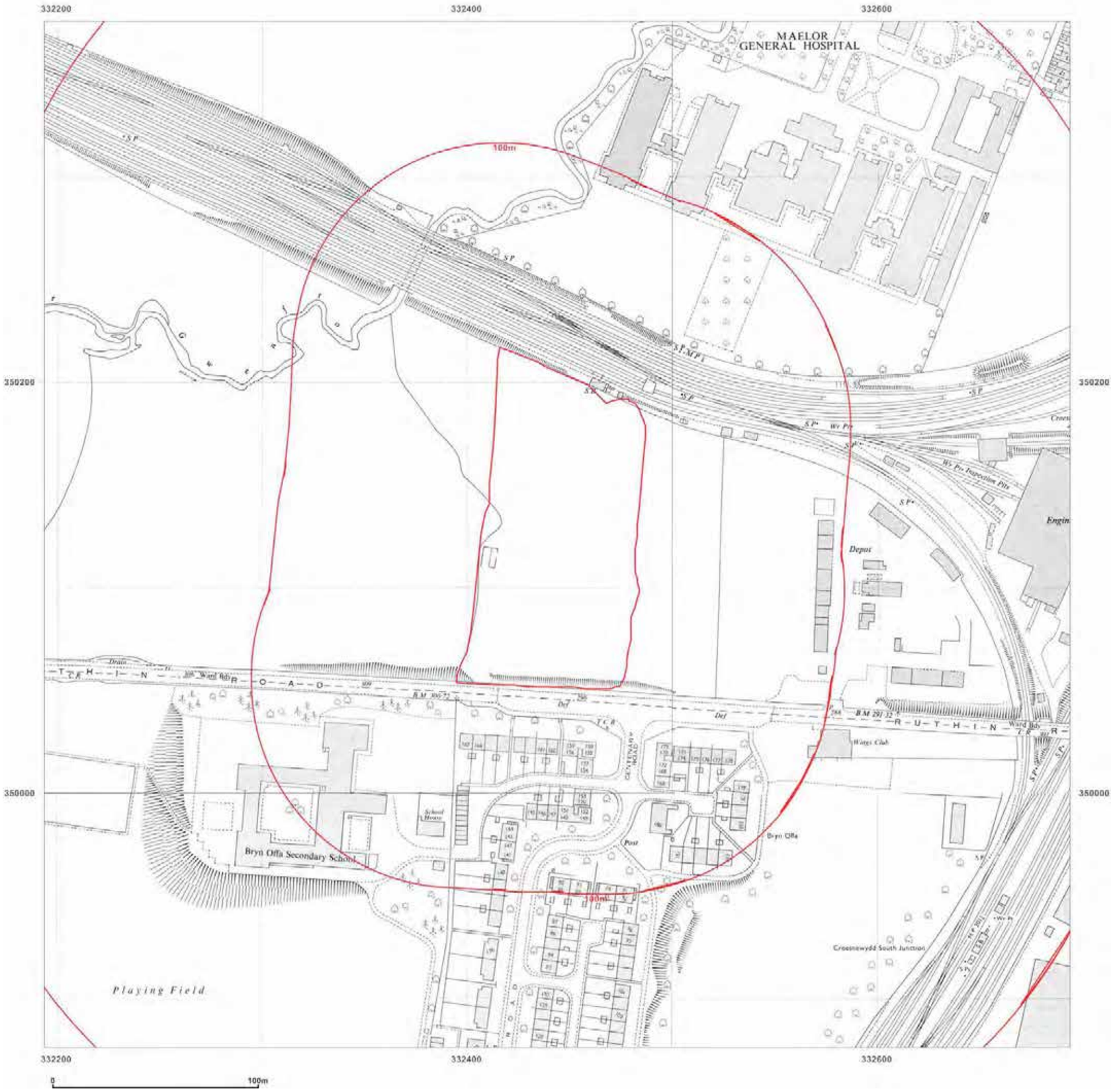

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Map Name: National Grid

Map date: **1963**

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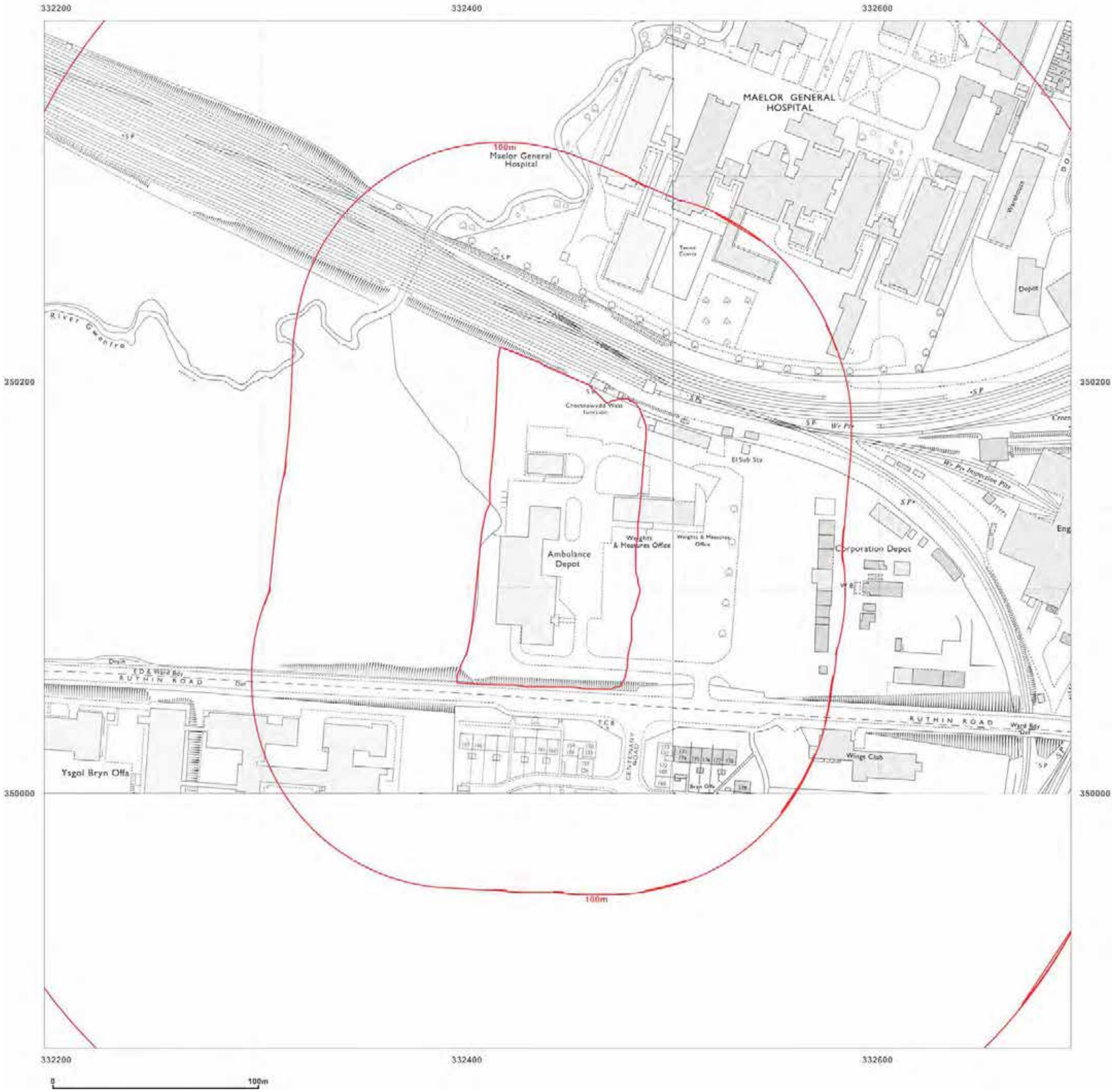

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Map Name: National Grid

Map date: **1970-1975**

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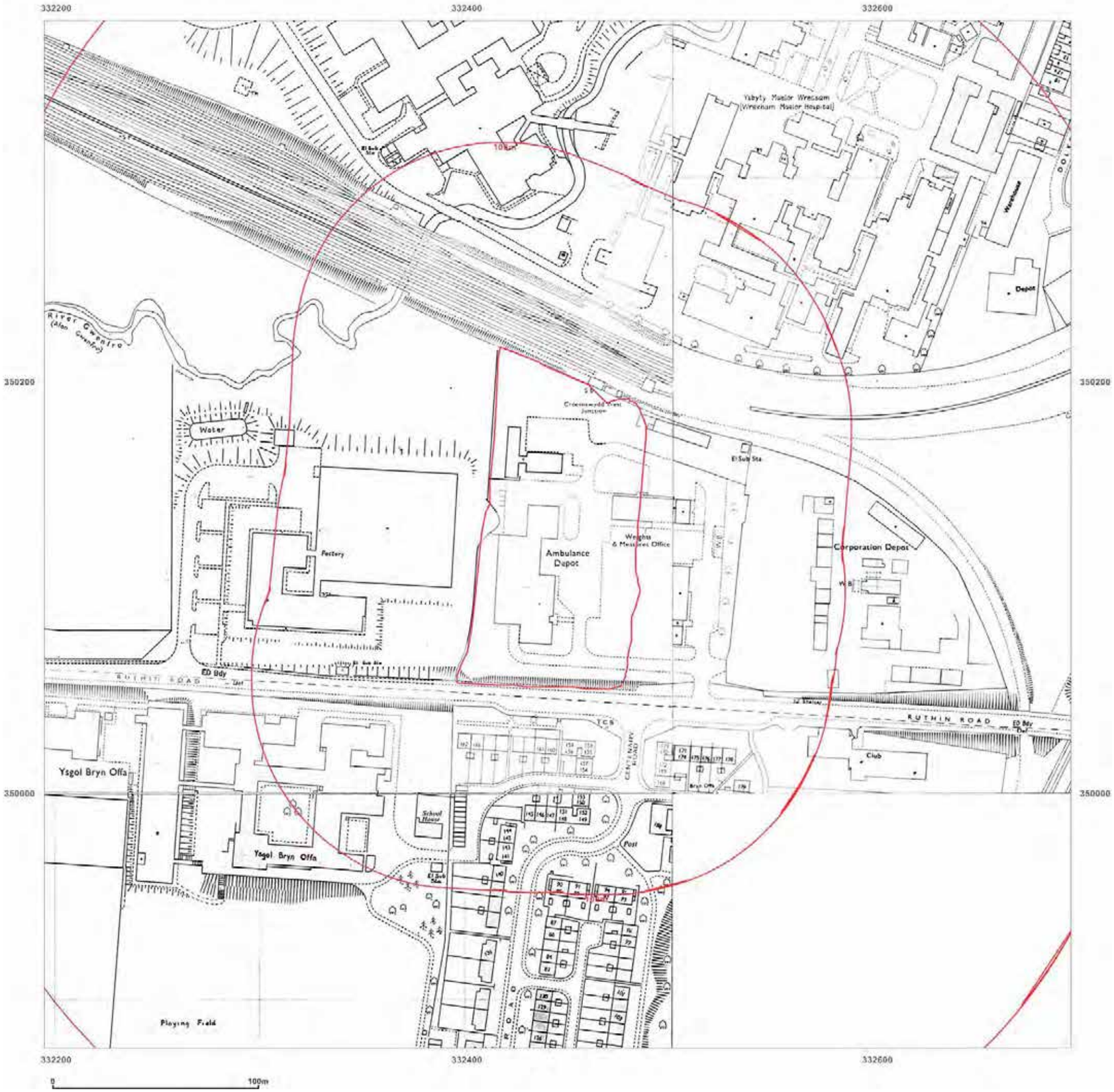

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Grid Ref: 332444, 350126

Map Name: National Grid

Map date: **1984-1989**

Scale: 1:1,250

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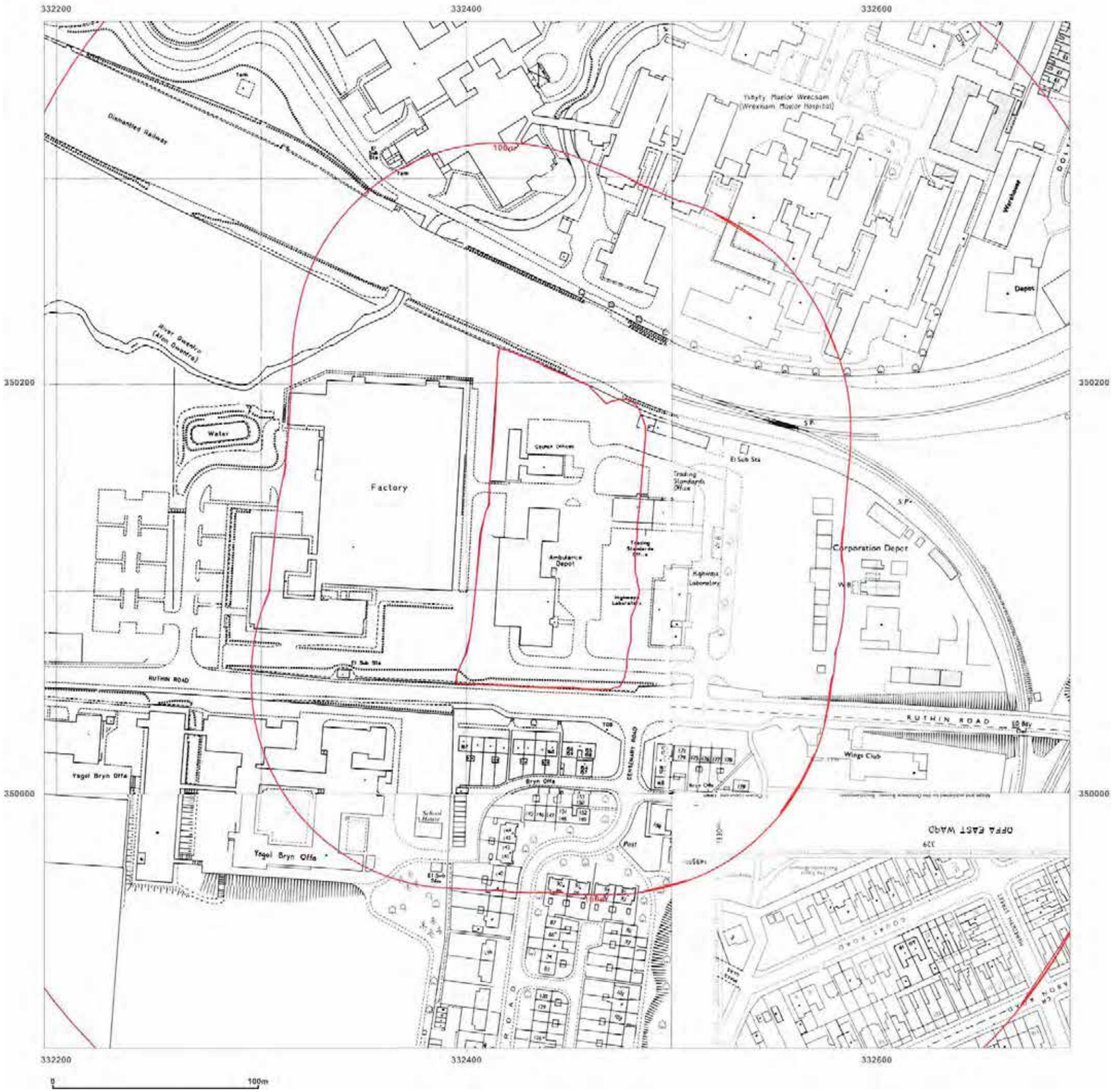

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Grid Ref: 332444, 350126

Map Name: National Grid

Map date: **1989-1992**

Scale: 1:1,250

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Grid Ref: 332444, 350126

Map Name: National Grid

Map date: **1989-1993**

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Grid Ref: 332444, 350126

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Report Ref: EMS-306480_413779
Grid Ref: 332444, 350126

Map Name: National Grid

Map date: **1992-1994**

Scale: 1:1,250

Printed at: 1:2,000

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Edition N/A
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Surveyed 1994
Revised 1994
Edition N/A
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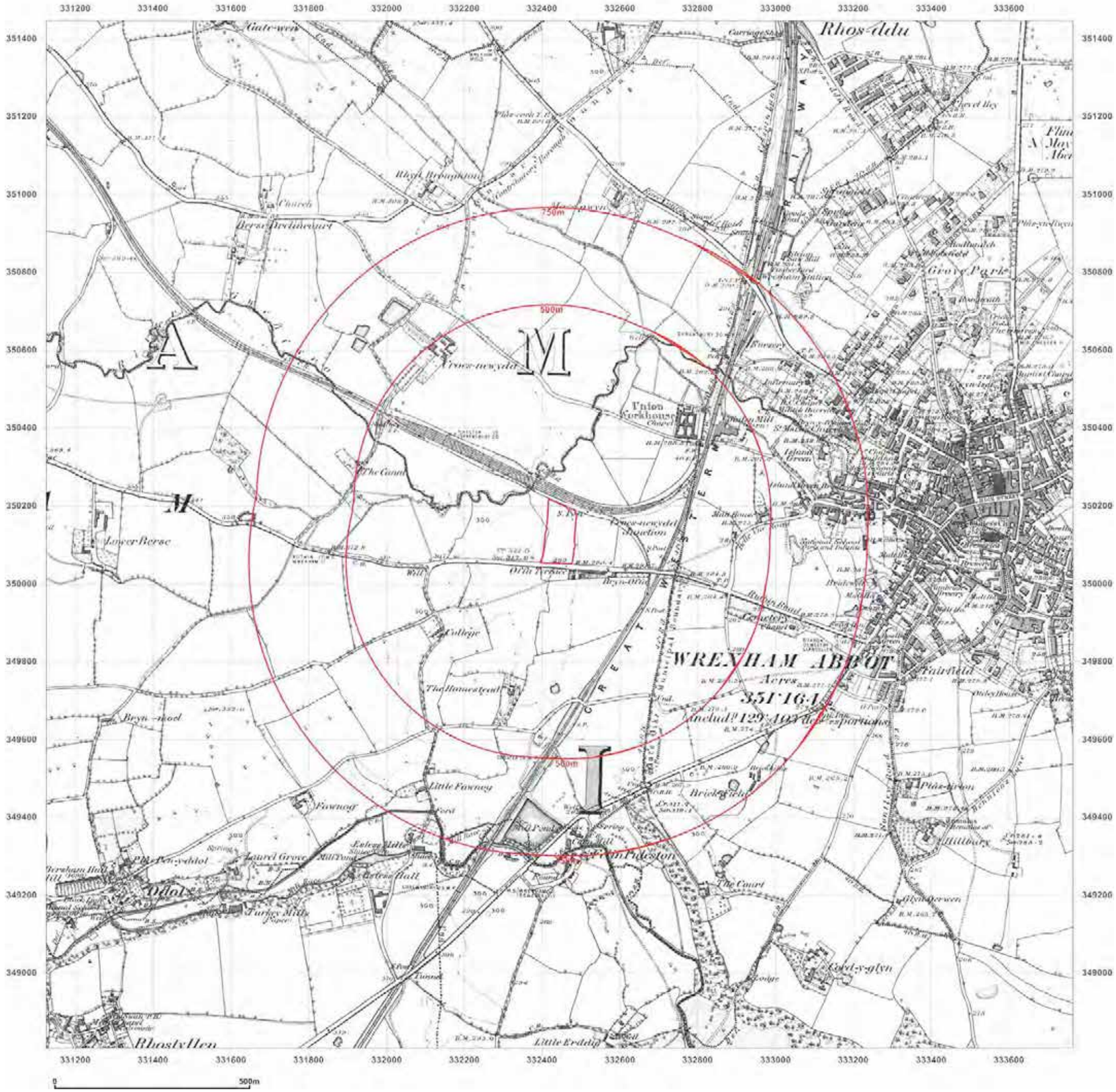

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Site Details:

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Client Ref: EMS_306480_413779
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Grid Ref: 332444, 350126

Map Name: County Series

Map date: **1872**

Scale: 1:10,560

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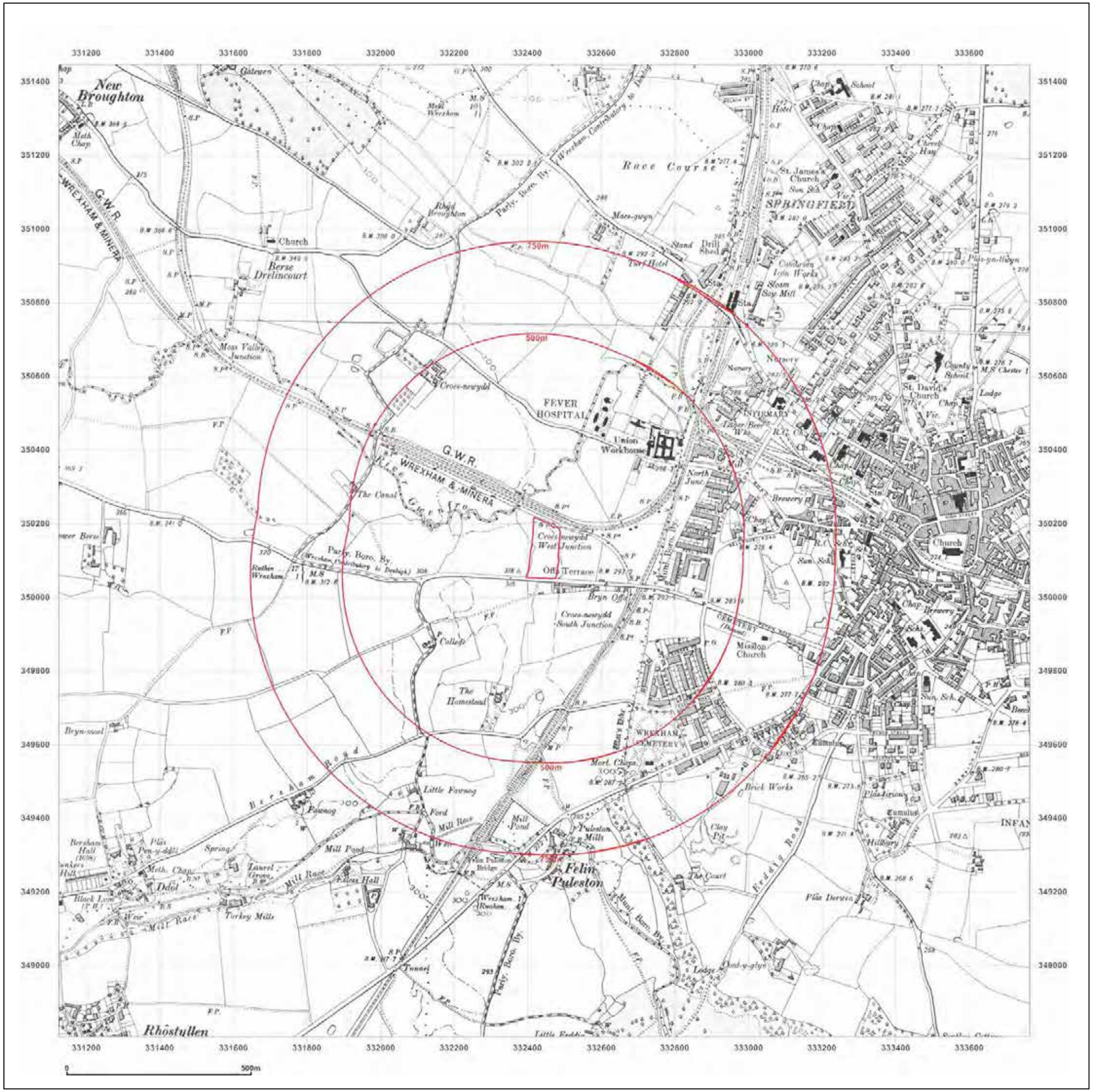

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Site Details:

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Client Ref: EMS_306480_413779
Report Ref: EMS-306480_413779
Grid Ref: 332444, 350126

Map Name: County Series

Map date: **1898**

Scale: 1:10,560

Printed at: 1:10,560

N
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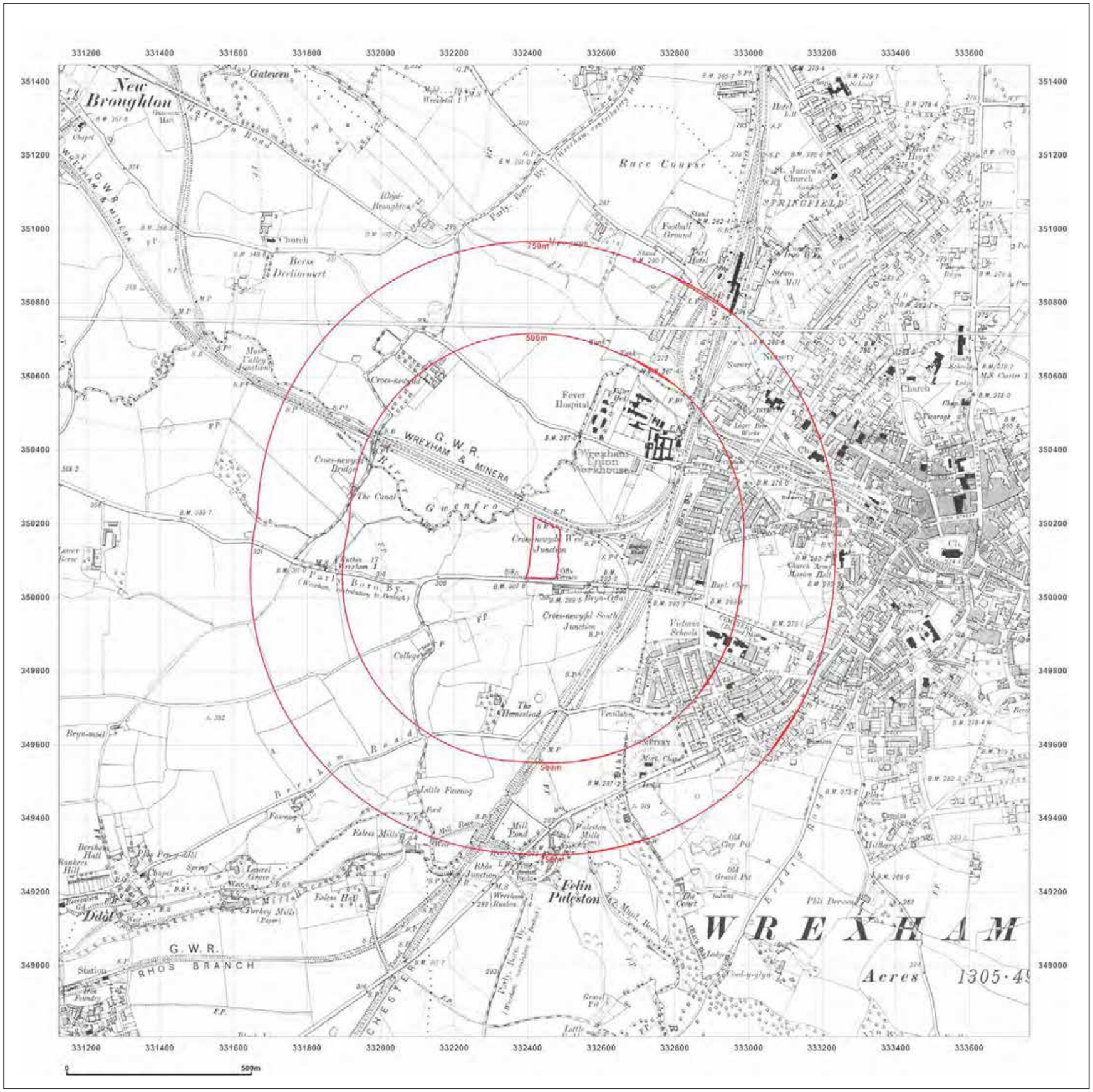

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Site Details:

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Client Ref: EMS_306480_413779
Report Ref: EMS-306480_413779
Grid Ref: 332444, 350126

Map Name: County Series

Map date: **1909-1910**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1871
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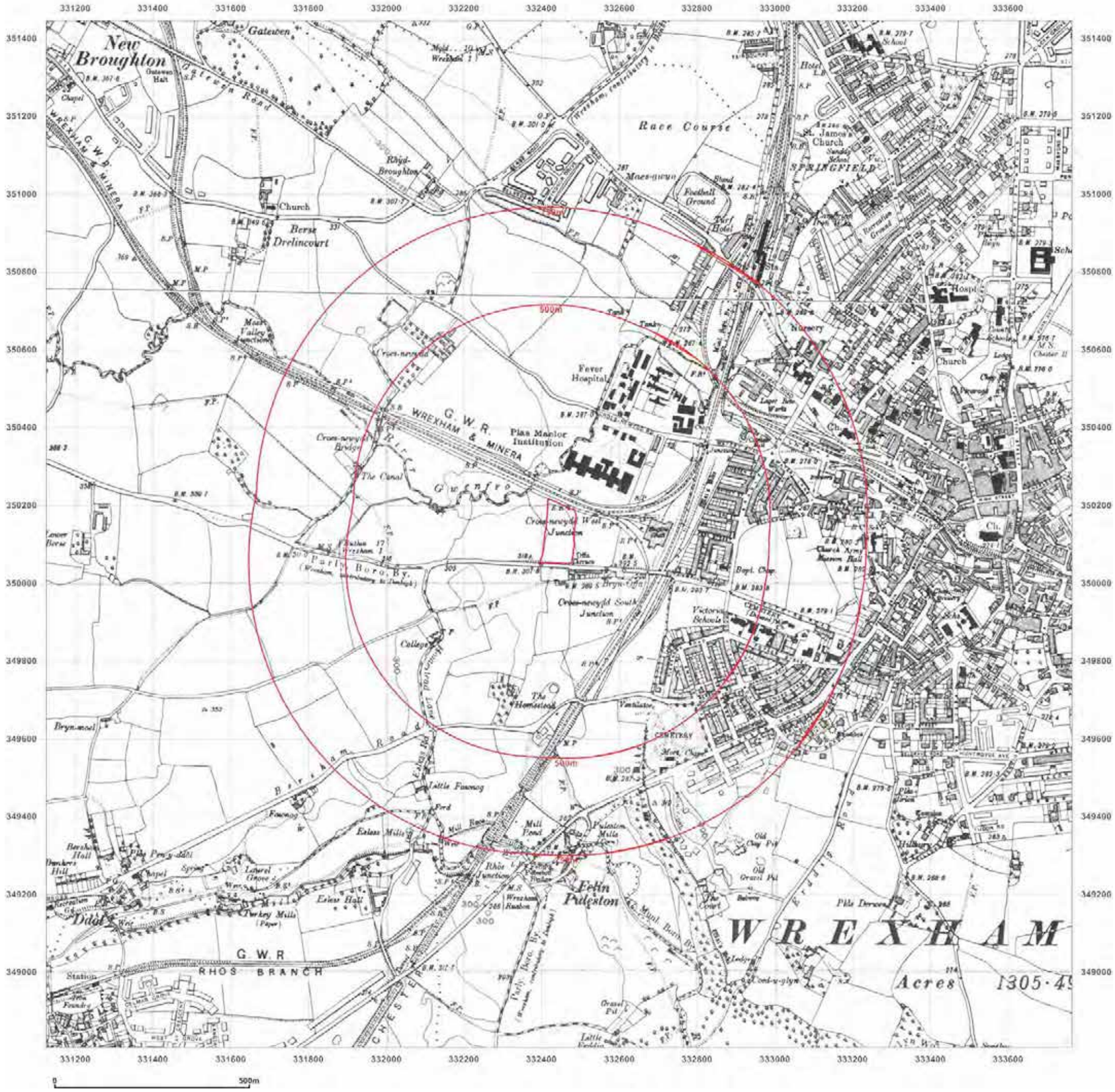

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Site Details:

Wrexham,Ruthin Road

Client Ref: EMS_306480_413779
Report Ref: EMS-306480_413779
Grid Ref: 332444, 350126

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

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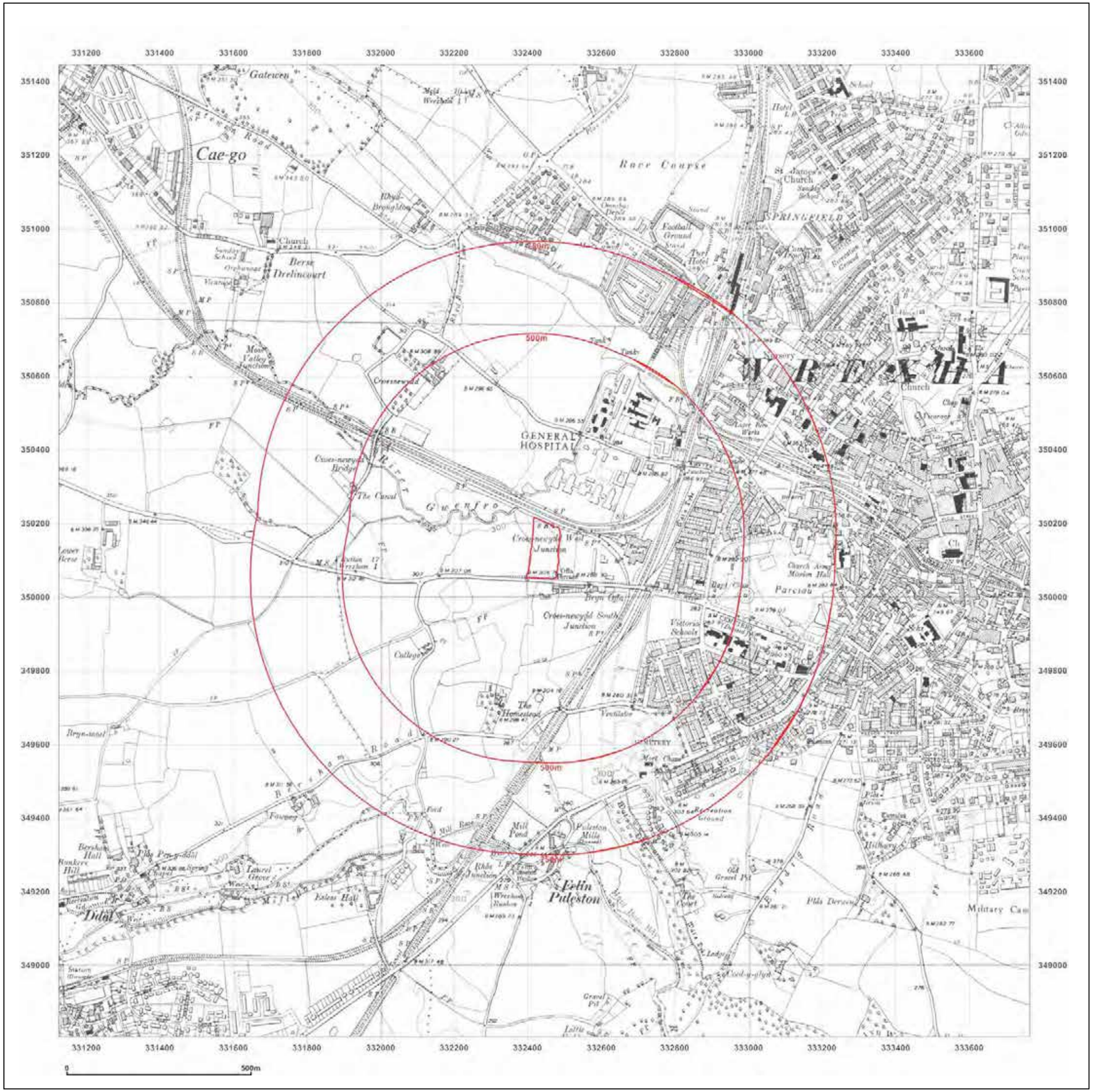

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Site Details:

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Client Ref: EMS_306480_413779
Report Ref: EMS-306480_413779
Grid Ref: 332444, 350126

Map Name: County Series

Map date: **1949**

Scale: 1:10,560

Printed at: 1:10,560

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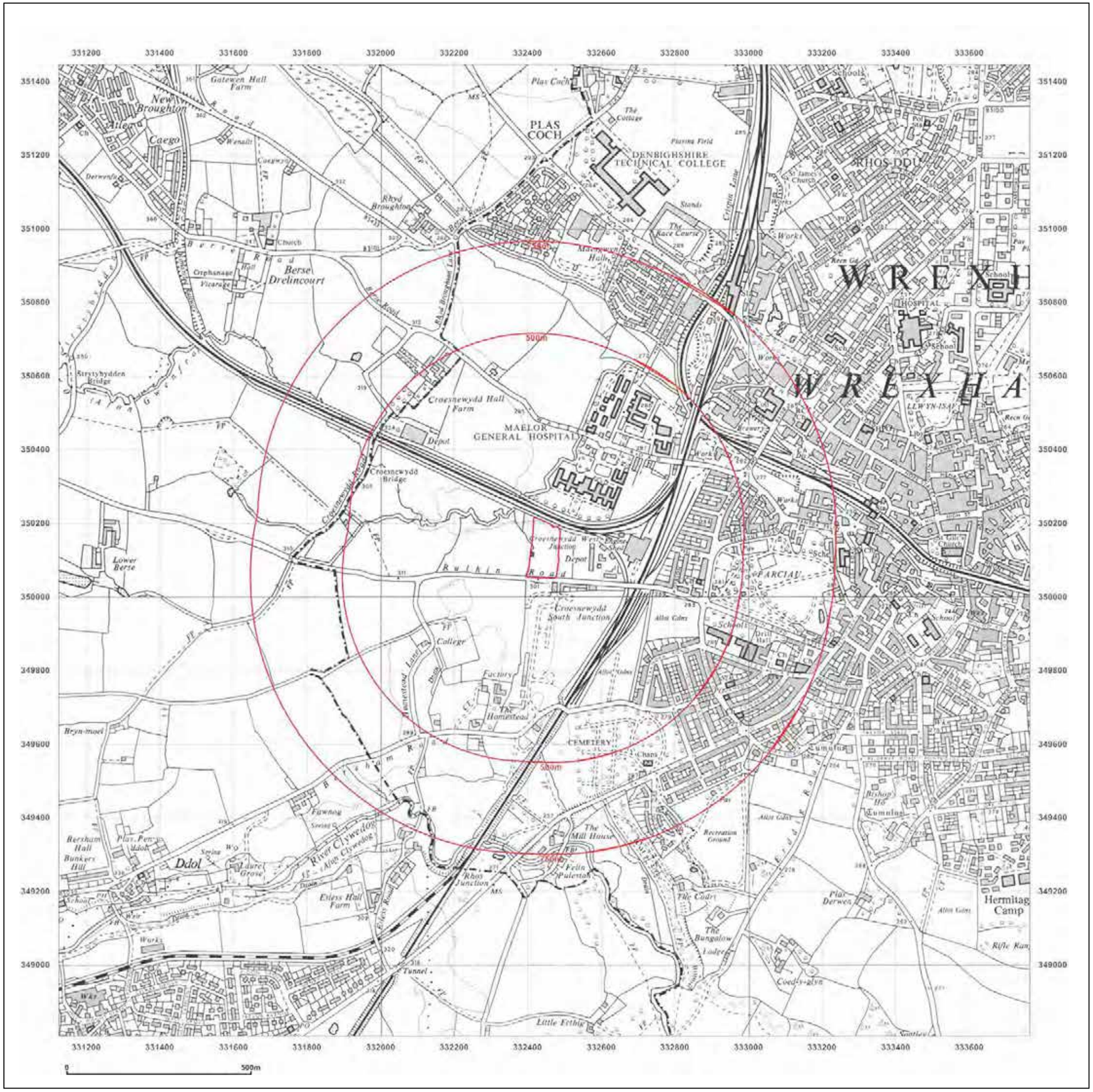
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500m
PLAS COCH
DENBIGHSHIRE TECHNICAL COLLEGE
RHOS DDU
WREXHAM
MAELOR GENERAL HOSPITAL
Croesnewydd Hall Farm
Croesnewydd Bridge
Croesnewydd South Junction
Rhuddlan Road
Berse Road
Berse Drelincourt
New Broughton
Caego
Gatewen Hall Farm
Rhyd Broughton
Lower Berse
Ddol
River Clywedog
Bersham Hall
Bunkers Hill
Esless Hall Farm
Rhos Junction
The Mill House
Felin Puleston
CEMETERY
The Homestead
College
Factory
Tunnel
Little Ethlis
Hermitage Camp
Bishop's Ho
Tumulus
Recreation Ground
The Cedars
The Bungalow
Lodge
Plas Derwen
Coed-y-glyn
Rifle Range
Allotments
Schools
Hospital
Stands
The Race Course
Cilcynis Lane
Bryn-moel
Fawnog
Laurel Grove
Strytyhydden Bridge
Derwenfa
Wenallt
Caegwyn
Orphanage
Vicarage
Church
Rhyd Broughton Lane
Maesgwyn Hall
Plas Coch
The Cottage
Playing Field
Works
Brewery
Gas Works
Rhuddlan Road
Croesnewydd Road
Croesnewydd Junction
Depot
Allotments
Drill Hall
Cemetery
Chapel
Tunnel
Weir
Bersham Road
Eyton Road
Esless Road
Hermitage Road
Rhuddlan Road
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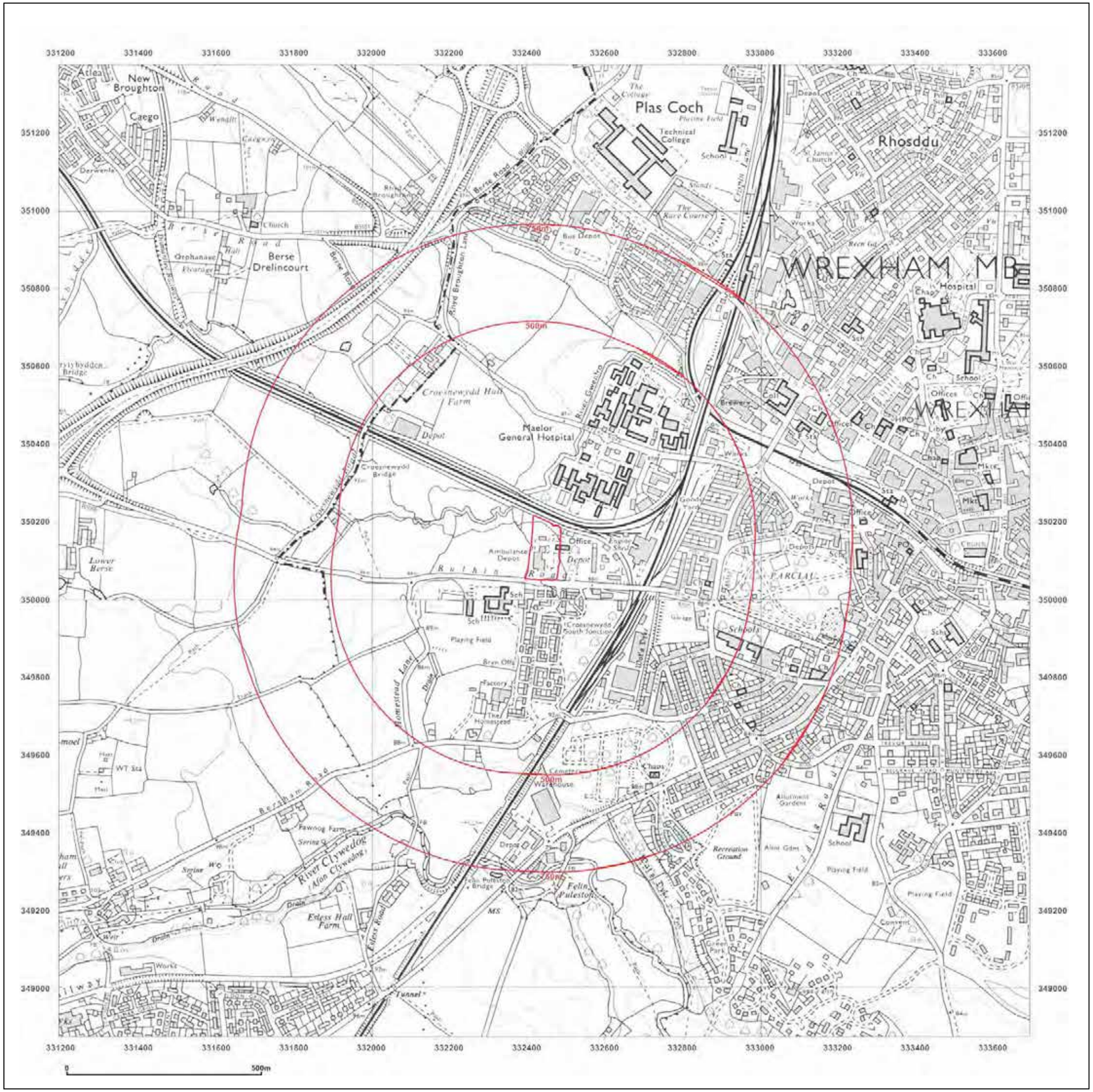

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Site Details:

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Client Ref: EMS_306480_413779
Report Ref: EMS-306480_413779
Grid Ref: 332444, 350126

Map Name: National Grid

Map date: **1974-1977**

Scale: 1:10,000

Printed at: 1:10,000

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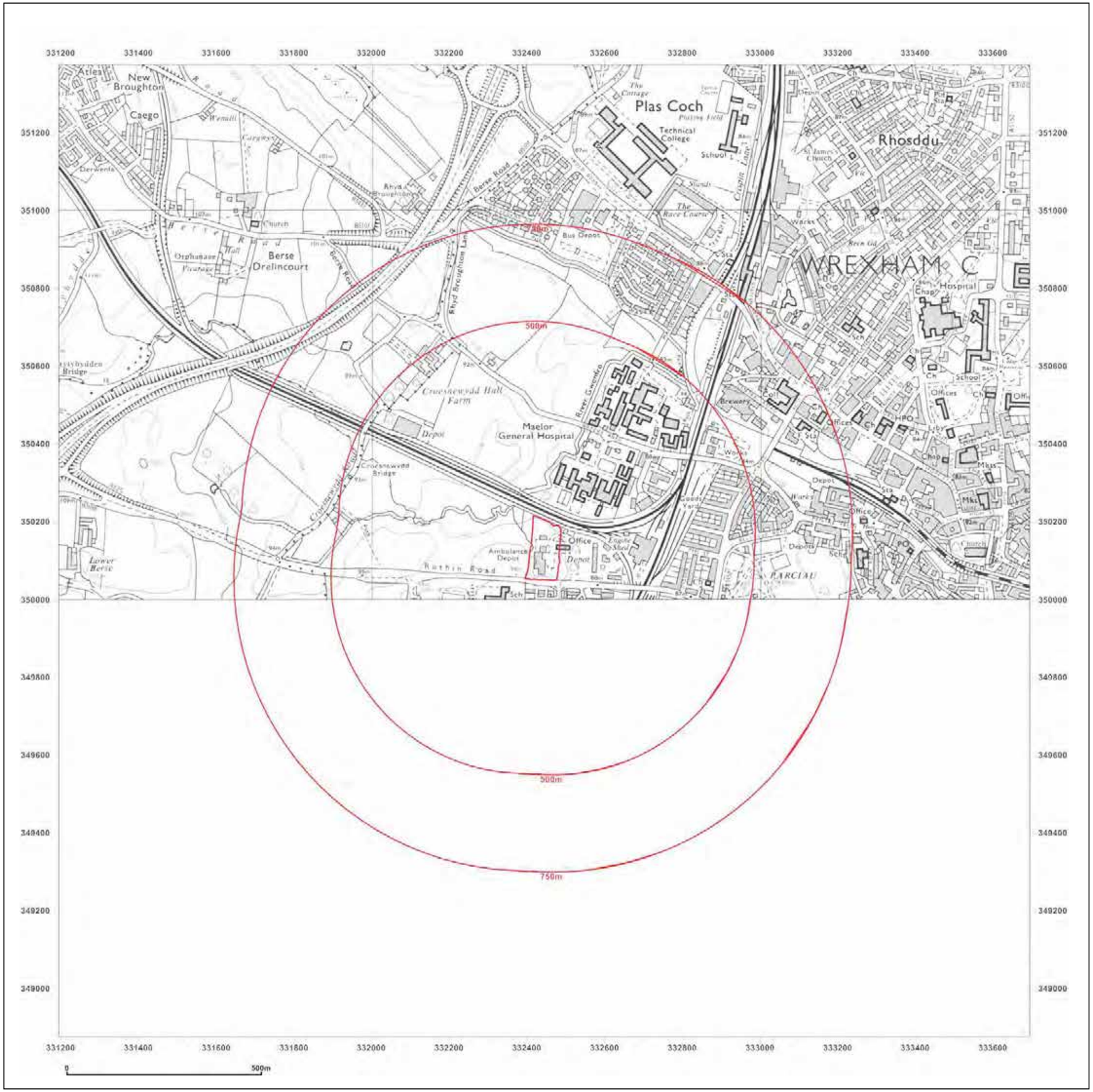

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Site Details:

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Client Ref: EMS_306480_413779
Report Ref: EMS-306480_413779
Grid Ref: 332444, 350126

Map Name: National Grid

Map date: **1980**

Scale: 1:10,000

Printed at: 1:10,000

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Revised 1980
Edition N/A
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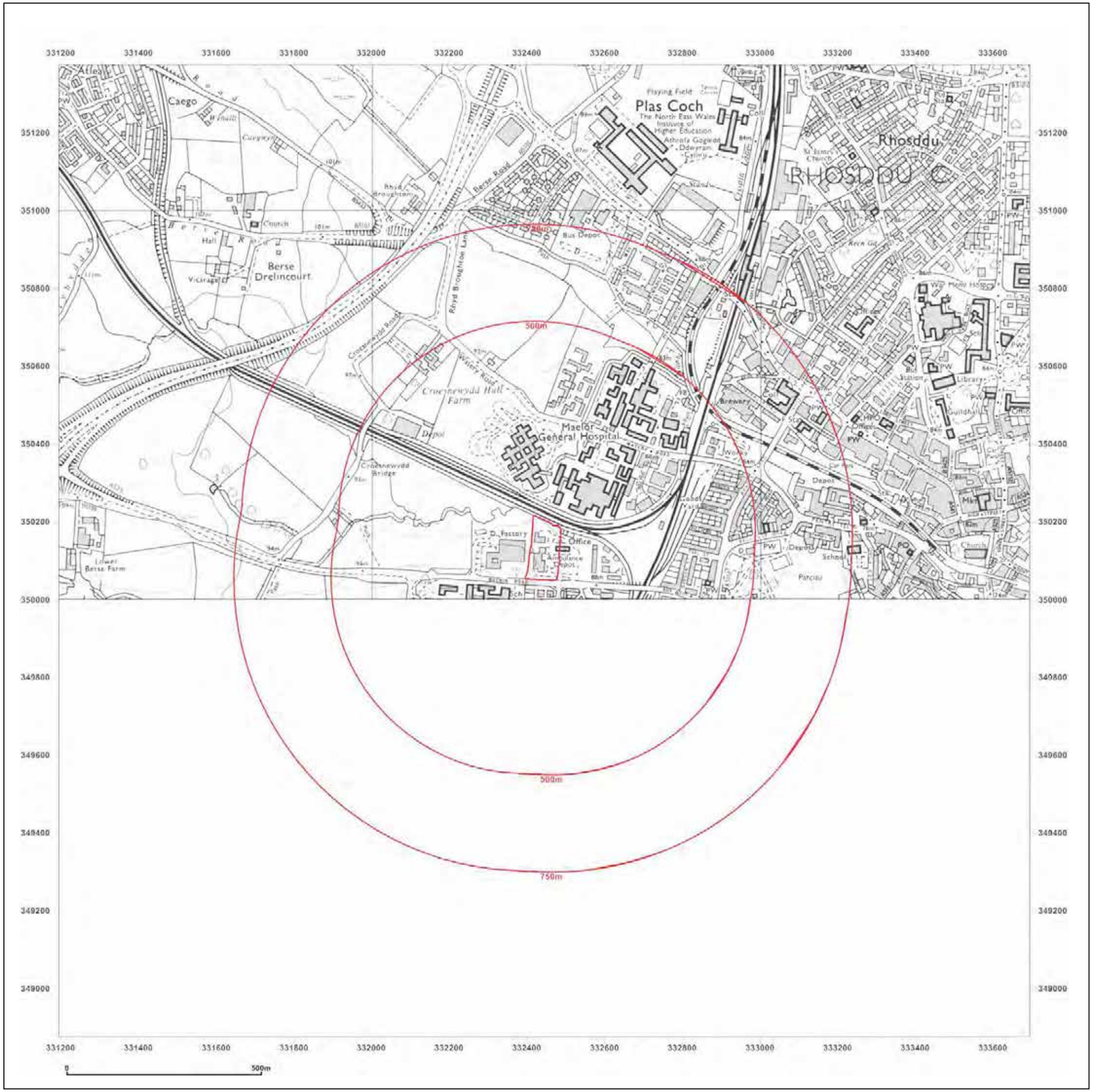

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Site Details:

Wrexham,Ruthin Road

Client Ref: EMS_306480_413779
Report Ref: EMS-306480_413779
Grid Ref: 332444, 350126

Map Name: National Grid

Map date: **1985**

Scale: 1:10,000

Printed at: 1:10,000

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Revised 1985
Edition N/A
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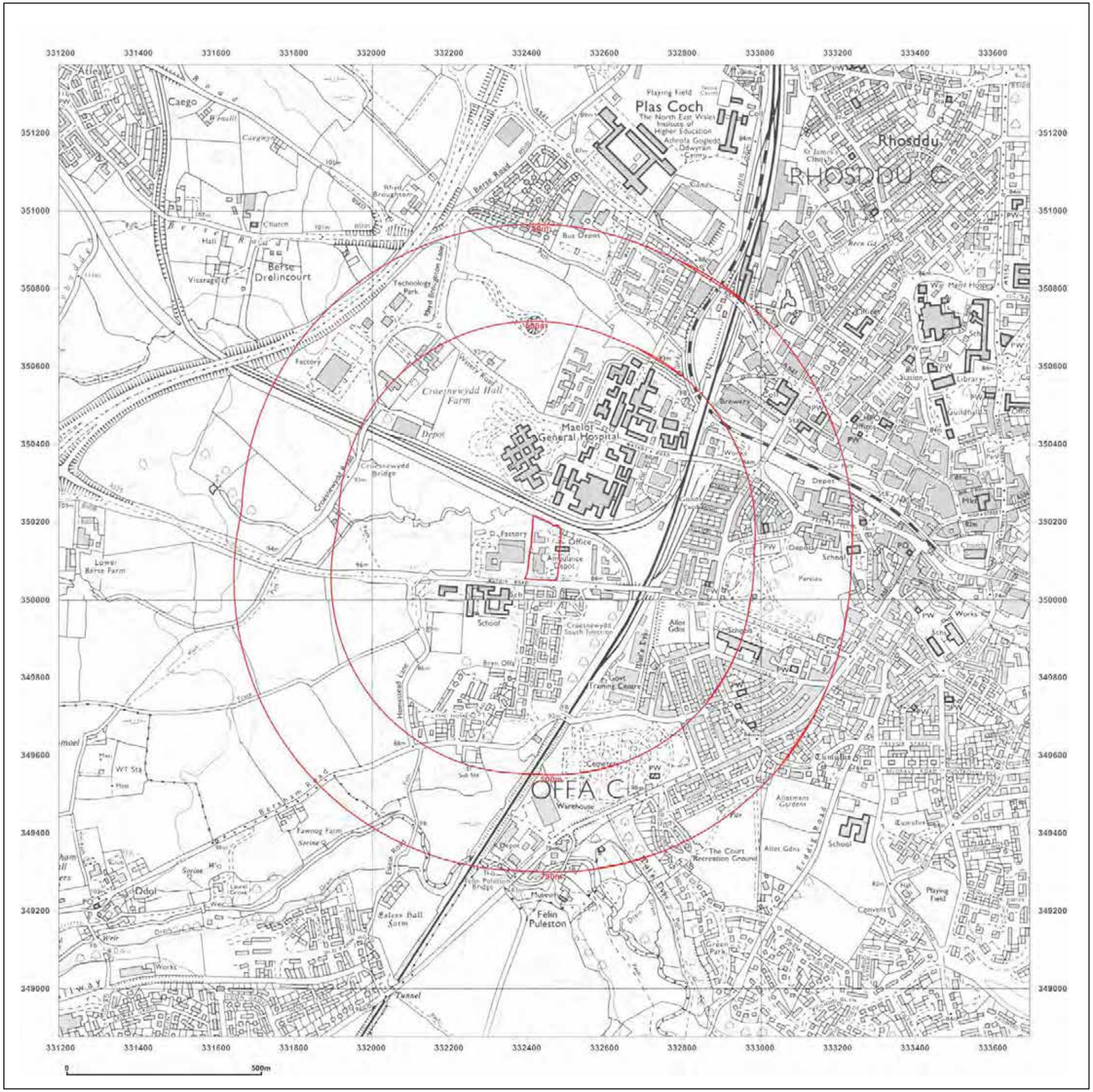

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Site Details:

Wrexham,Ruthin Road

Client Ref: EMS_306480_413779
Report Ref: EMS-306480_413779
Grid Ref: 332444, 350126

Map Name: National Grid

Map date: **1989-1992**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1985
Revised 1989
Edition N/A
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Levelled N/A

Surveyed 1987
Revised 1992
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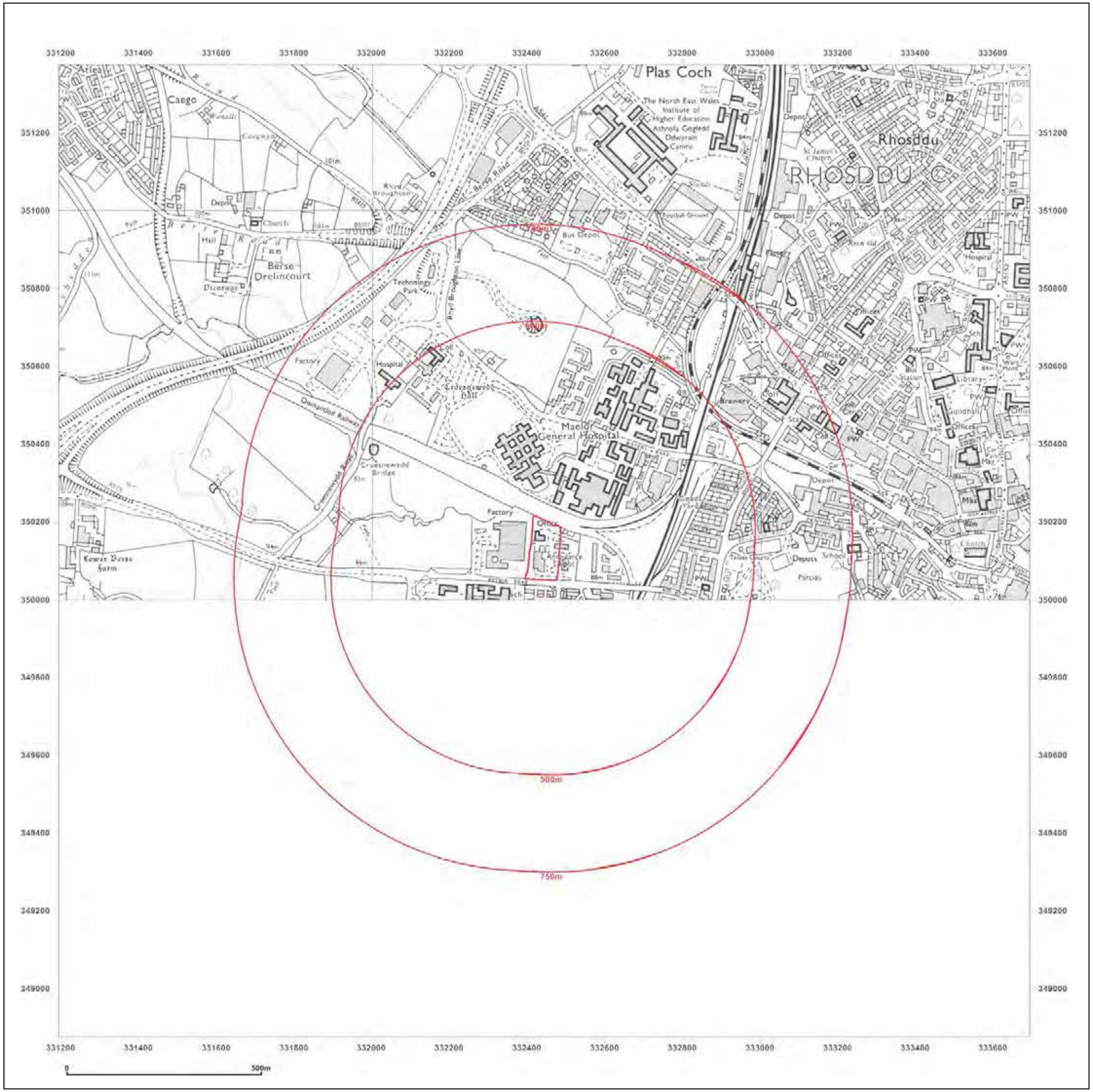

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Site Details:

Wrexham,Ruthin Road

Client Ref: EMS_306480_413779
Report Ref: EMS-306480_413779
Grid Ref: 332444, 350126

Map Name: National Grid

Map date: **1992**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1990
Revised 1992
Edition N/A
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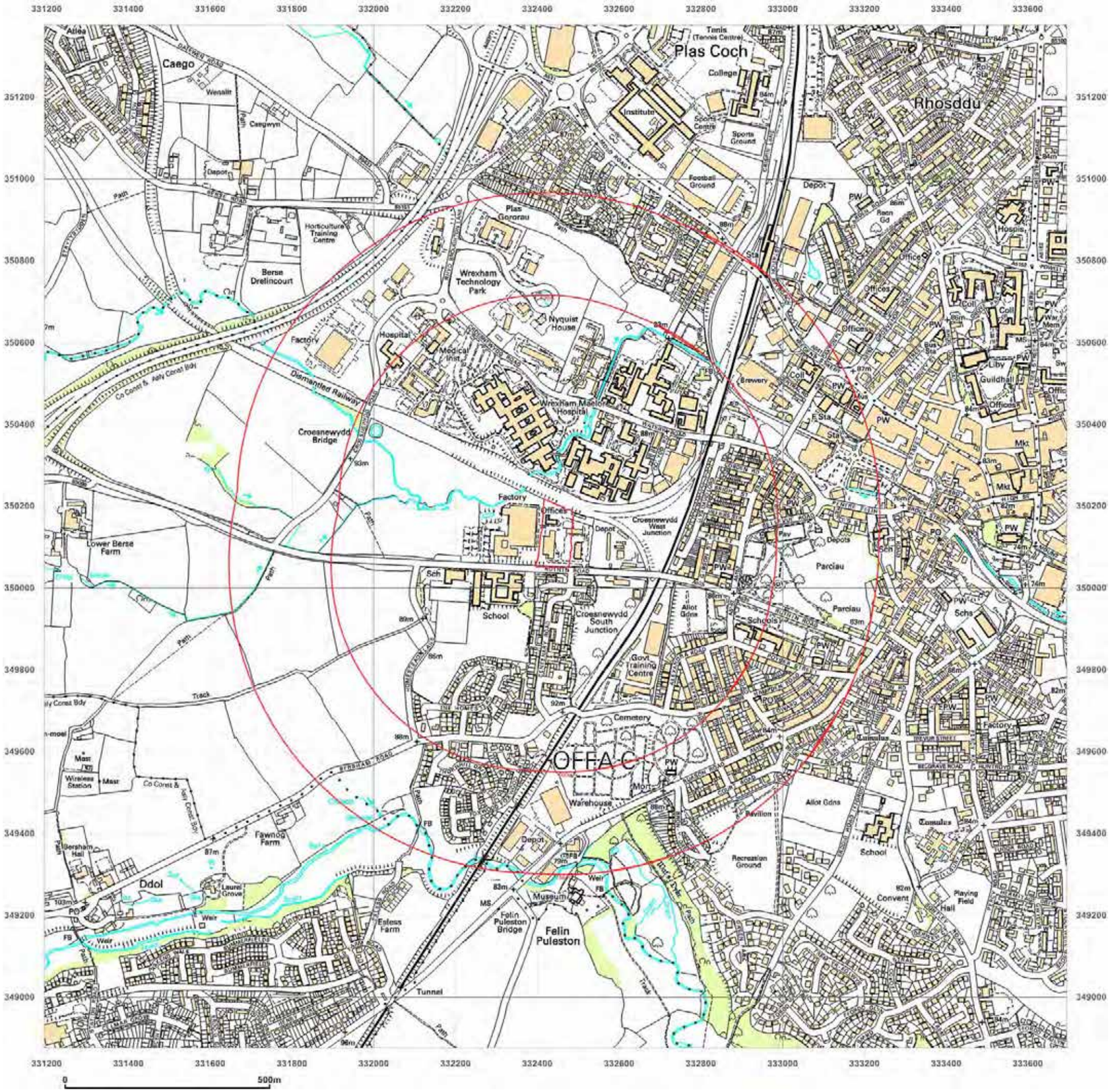

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Site Details:

Wrexham,Ruthin Road

Client Ref: EMS_306480_413779
Report Ref: EMS-306480_413779
Grid Ref: 332444, 350126

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000

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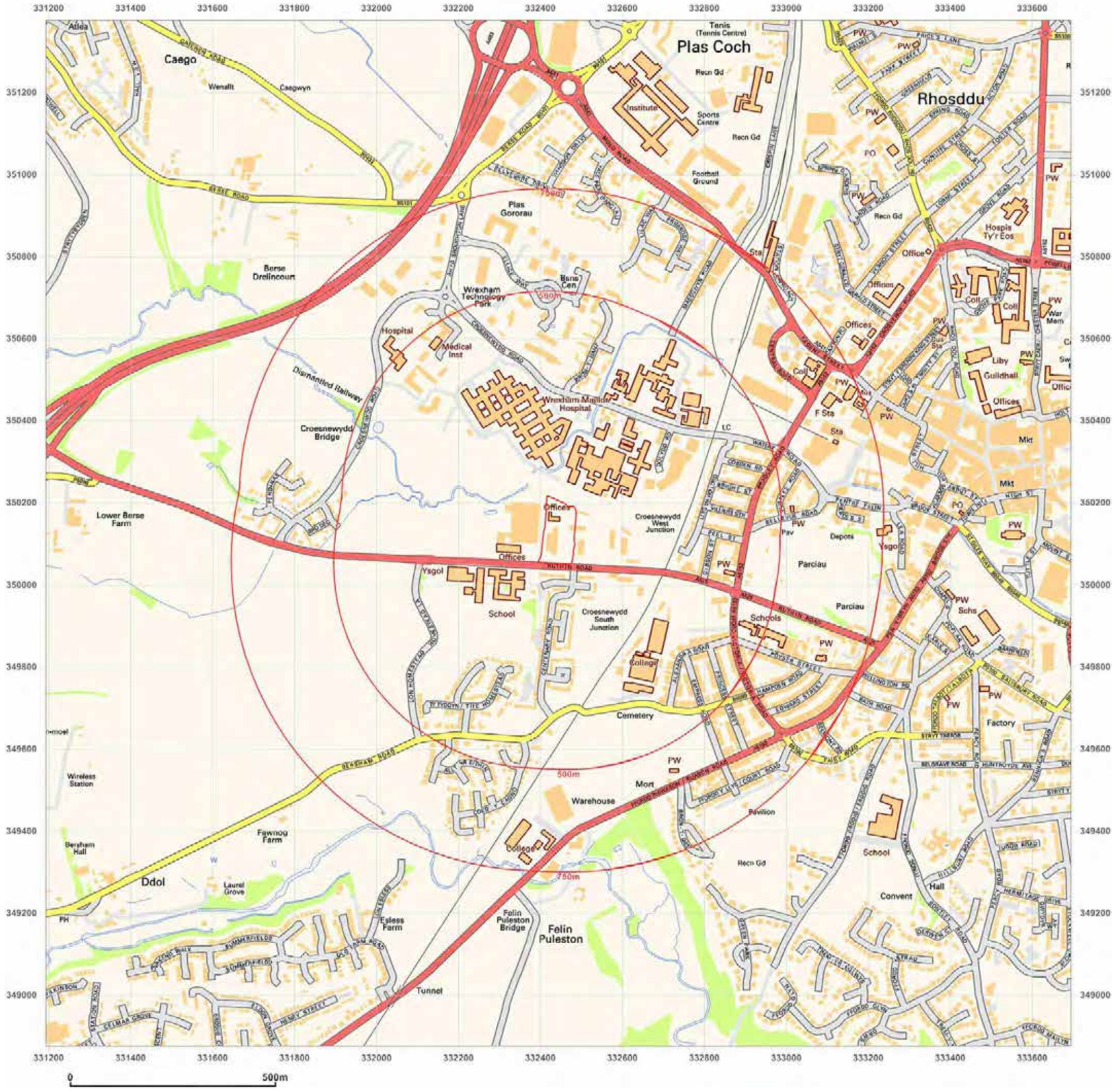

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Site Details:

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Client Ref: EMS_306480_413779
Report Ref: EMS-306480_413779
Grid Ref: 332444, 350126

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

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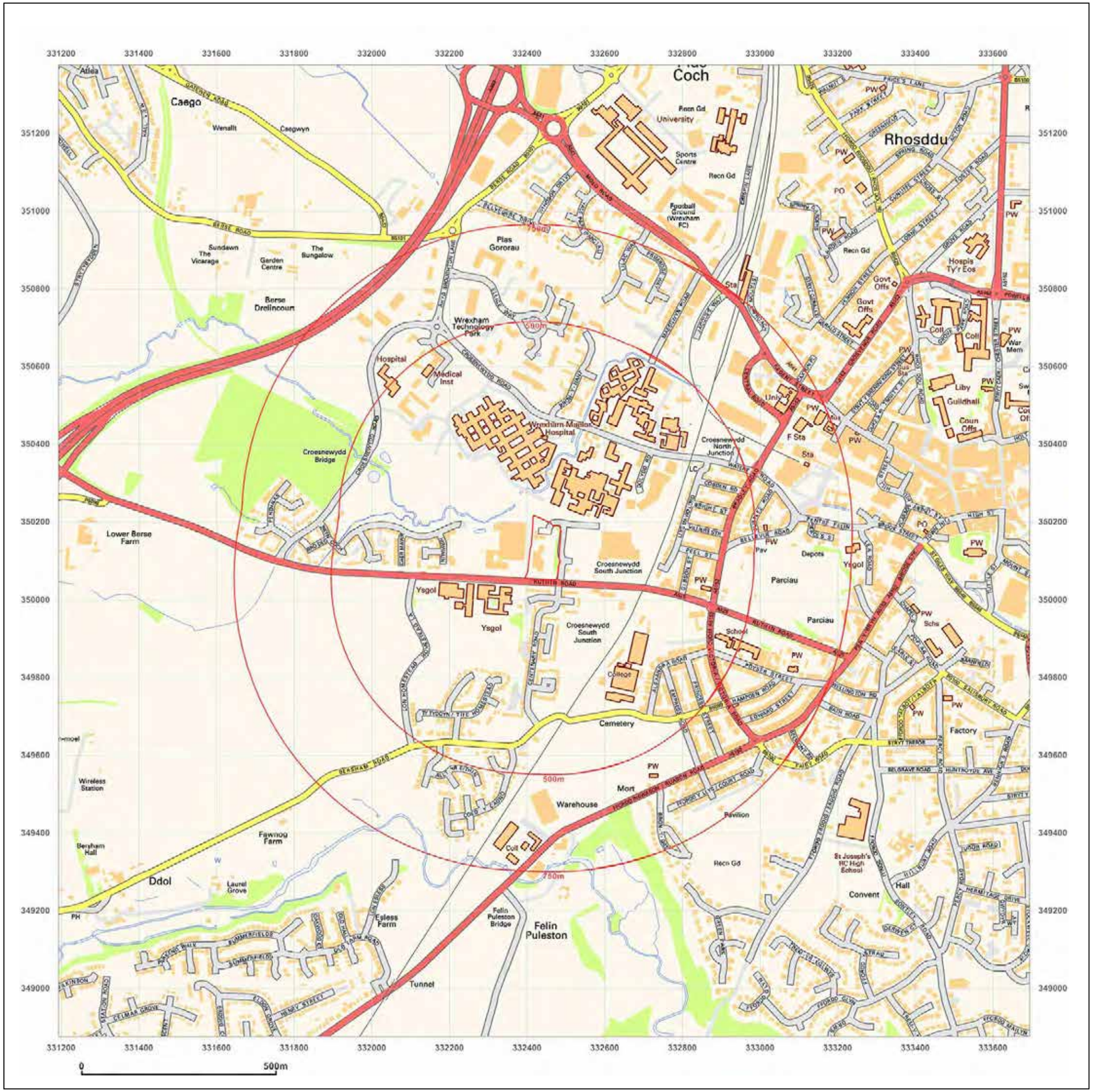

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Site Details:

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Client Ref: EMS_306480_413779
Report Ref: EMS-306480_413779
Grid Ref: 332444, 350126

Map Name: National Grid

Map date: **2014**

Scale: 1:10,000

Printed at: 1:10,000

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2010

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APPENDIX B
Contaminated Land Officers Report

Head of Housing, Public Protection and Environment
Pennaeth Tai, Gwarchod y Cyhoedd a'r Amgylchedd
Andy Lewis

Housing, Public Protection and Environment Department, Ruthin Road, Wrexham LL13 7TU
Adran Tai, Gwarchod y Cyhoedd a'r Amgylchedd, Ffordd Rhuthun, Wrecsam LL13 7TU
Tel/Ffôn: 01978 315500 Fax/Ffacs: 01978 315320 BT Text Phone: 01978 292067
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BY EMAIL ONLY

Sam Flaherty
Brownfield Solutions Limited
Wychwood House
1 Queen Street
Northwich
Cheshire
CW9 5JL

Your Ref/Eich Cyf	
Our Ref/Ein Cyf	Search 538
Date/Dyddiad	02 June 2015
Ask for/Gofynner am	Stacey Inglis
Direct Dial/Rhif Union	01978 297435
E-mail/E-bost	Stacey.inglis@wrexham.gov.uk

Dear Mr Flaherty

OLD AMBULANCE STATION, RUTHIN ROAD, WREXHAM

Thank you for your email dated 01 June 2015 attaching a copy of the Environmental Search for the above property. I can respond to your enquiry as follows.

1. Details of any known environmental problems or land reclamation schemes that would affect the site.

   This Department is not aware of any known environmental problems or land reclamation schemes that would affect the site.

2. Whether the Local Authority consider the site to be, or likely to be, contaminated land under Section S78 of the Environmental Protection Act 1990 as amended by the Environmental Protection Act 1995

   The Authority does not yet have a comprehensive database regarding historic land use or contamination, however the limited information available to the Housing, Public Protection and Environment Department indicates that the site is an ambulance depot, with fuel storage tanks, a use that may give rise to ground contamination and therefore at some time will have to be considered by the Council under Part 2A. Unfortunately the Council does not yet have a list of prioritised sites for the inspection under Part 2A and therefore it is impossible to advise you of a likely time when such an assessment would take place.

3. Whether the site is likely to be the subject of a Remediation Notice either currently or in the future.

   It is not possible to state if the site would be subject to a Remediation Notice, either currently or in the future, as the site has <u>not</u> been investigated and subsequently found to meet the legal definition of Contaminated Land as defined under Part 2A of the Environmental Protection Act, 1990.

INVESTOR IN PEOPLE

4. Whether the site could be considered a Special Site.

   It is not anticipated that the site would be considered a Special Site.

5. Landfill sites, either current, suspected or disused which may be within 250m of the site.

   As previously stated we do not have a comprehensive database regarding historic land use or contamination, however, the limited information available to the Housing, Public Protection and Environment Department indicates that there are no landfill sites within 250 of the site.

6. Any record of pollution incidences on or in the vicinity of the site.

   Our records do not indicate that any pollution incidents have occurred on or in the vicinity of the site.

7. Any other information which could assist in our assessment.

   No further information is available.

Should you have any further queries please do not hesitate to contact me on the above number. An invoice for the £51 + VAT will be issued shortly.

We aim to provide our service fairly and we monitor our services to check we are meeting this standard. To help us do this I would be grateful if you would visit the following link http://www.surveymonkey.com/s/ppequalitymonitoring and complete the equality questionnaire, which will only take about 2 minutes of your time. Note that this questionnaire is anonymous.

Yours sincerely

Stacey Inglis
Contaminated Land Officer

Would you like to receive a copy of this information/correspondence in a different language or format (Braille, Audio Tape etc.)? If so, please contact Public Protection Services on 01978 298989 / public_protection _service@wrexham.gov.uk so arrangements can be made.

A hoffech chi dderbyn copi o'r wybodaeth/gohebiaeth hyn mewn iaith neu ddiwyg gwahanol (braille, tâp sain ac ati)? Os hoffech, yna cysylltwch â Gwasanaethau Diogelu'r Cyhoedd ar 01978 298989 / public_protection _service@wrexham.gov. fel y gellir gwneud trefniadau

APPENDIX C
Groundsure Report

EmapSite

Masdar House, ,
Eversley, RG27 0RP

Groundsure Reference:	EMS-306480_413780
Your Reference:	EMS_306480_413780
Report Date	29 May 2015
Report Delivery Method:	Email - pdf

Groundsure Enviroinsight

Address: Wrexham,Ruthin Road,

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviroinsight** as requested.

If you would like further assistance regarding this report then please contact the emapsite customer services team on 0118 9736883 quoting the above report reference number.

Yours faithfully,

emapsite customer services team

Enc.
Groundsure Enviroinsight

Groundsure Enviroinsight

Address:	**Wrexham,Ruthin Road,**
Date:	**29 May 2015**
Reference:	**EMS-306480_413780**
Client:	**EmapSite**

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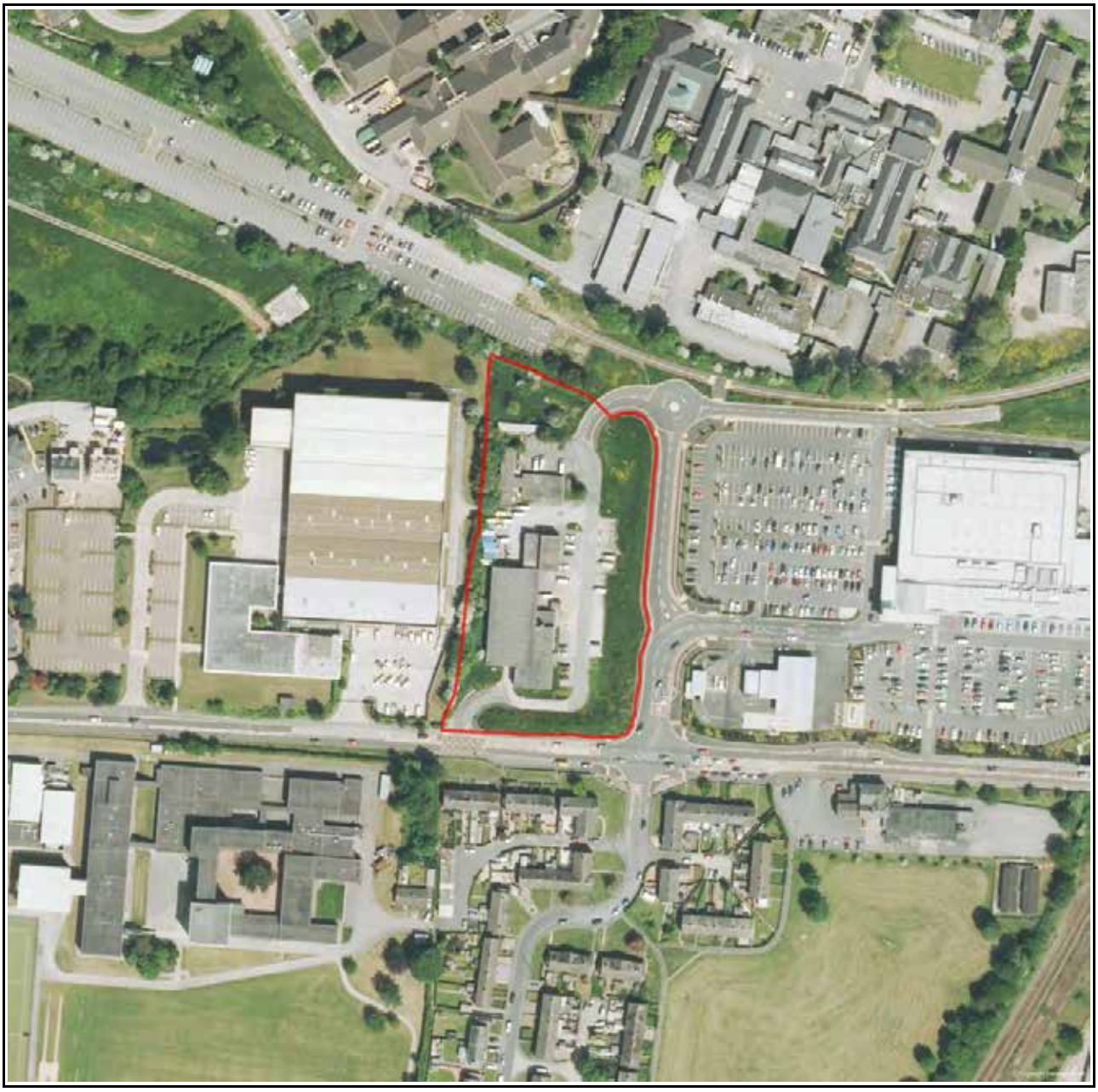

SW S SE

Aerial Photograph Capture date:	09-Jun-2013
Grid Reference:	332444,350126
Site Size:	1.14ha

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Overview of Findings

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Section 1: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
1.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
1.1.1 Records of historic IPC Authorisations	0	0	0	0
1.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
1.1.3 Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0
1.1.4 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	0
1.1.5 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
1.1.6 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
1.1.7 Records of Part A(2) and Part B Activities and Enforcements	0	1	0	0
1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	15	1
1.1.9 Records of Licensed Discharge Consents	0	0	3	5
1.1.10 Records of Planning Hazardous Substance Consents and Enforcements	0	0	0	0
1.2 Records of COMAH and NIHHS sites	0	0	0	0
1.3 Environment Agency Recorded Pollution Incidents				
1.3.1 National Incidents Recording System, List 2	0	0	0	0
1.3.2 National Incidents Recording System, List 1	0	0	0	0
1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 2: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-5000
2.1 Landfill Sites						
2.1.1 Environment Agency Registered Landfill Sites	0	0	0	0	1	Not searched
2.1.2 Environment Agency Historic Landfill Sites	0	0	0	0	2	1
2.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0

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Section 2: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-5000
2.1.4 Landfills from Local Authority and Historical Mapping Records	0	0	0	0	2	0
2.2 Landfill and Other Waste Sites Findings						
2.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	1	Not searched	Not searched
2.2.2 Environment Agency Licensed Waste Sites	0	0	0	0	3	0

Section 3: Current Land Use	On-site	0-50m	51-250	251-500
3.1 Current Industrial Sites Data	1	2	12	Not searched
3.2 Records of Petrol and Fuel Sites	0	0	1	1
3.3 National Grid Underground Electricity Cables	0	0	0	0
3.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 4: Geology	
4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	Yes
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
4.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 5: Hydrogeology and Hydrology	0-500m
5.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes
5.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
5.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	3	0
5.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	2	0	2	4
5.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	2
5.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
5.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
5.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	2	0	2	0	Not searched	Not searched
	On-site	0-50m	51-250	251-500	501-1000	1000-1500

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Section 5: Hydrogeology and Hydrology

	0-500m					
5.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	Yes	Yes	Yes
5.10 Detailed River Network entries within 500m of the site	0	0	1	6	Not searched	Not searched
5.11 Surface water features within 250m of the study site	No	No	Yes	Not searched	Not searched	Not searched

Section 6: Flooding

6.1 What is the highest risk of flooding within 25m of the centre of the study site?	Low
6.2 Are there any Flood Defences within 250m of the study site?	No
6.3 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
6.4 Are there any areas used for Flood Storage within 250m of the study site?	No
6.5 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential at Surface
6.6 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	High

Section 7: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	1	0
7.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
7.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
7.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
7.5 Records of Ramsar sites	0	0	0	0	0	0
7.6 Records of Ancient Woodlands	0	0	0	0	10	47
7.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
7.8 Records of World Heritage Sites	0	0	0	0	0	0
7.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
7.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0

Section 7: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
7.11 Records of National Parks	0	0	0	0	0	0
7.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
7.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
7.14 Records of Green Belt Data	0	0	0	0	0	0

Section 8: Natural Hazards

8.1 What is the maximum risk of natural ground subsidence?	Moderate
8.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Very Low
8.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
8.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
8.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Moderate
8.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
8.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Low

Section 9: Mining

9.1 Are there any coal mining areas within 75m of the study site?	Yes
9.2 What is the potential for undermining as a result of underground mineral extraction, excluding coal and minerals extracted as a consequence of coal mining?	Highly Unlikely
9.3 Are there any brine affected areas within 75m of the study site?	No

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

1. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

2. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

3. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

4. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

5. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

6. Flooding

Provides information on surface water flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

7. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

8. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence.

9. Mining

Provides information on areas of coal, “non-coal” mining and brine affected areas.

10. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier “A” on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as “Not Shown”.

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Environmental Permits, Incidents and Registers Map

NW N NE

W E

SW S SE

Environmental Permits, Incidents and Registers Legend

Mapping sourced from Ordnance Survey

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- Site Outline
- 250 — 500 — Search Buffers (m)
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licensed Discharge Consents
- Red List Discharge Consents
- Radioactive Consents (Lower Risk)
- Part A(1) Authorised Processes & Historic IPC Authorisations
- Part A(2) and Part B Authorisations
- Sites Determined as Contaminated Land
- COMAH / NIHHS Sites
- Hazardous Substance Consents & Enforcements

1. Environmental Permits, Incidents and Registers

1.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

1.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

1.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

1.1.3 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

1.1.4 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

1.1.5 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

1.1.6 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

1.1.7 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

1

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details	
9	50.0	E	332533 350111	Address: Morrisons Petrol Filling Station, Ruthin Road, Wrexham, LL13 7TU Process: Petrol Filling Station Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified. Date of Enforcement: No Enforcement Notified. Comment: No Enforcement Notified.

1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations:

16

The following RAS Licence (3 or 4) records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Address	Operator	Type	Permission Number	Dates	Status
26C	143.0	NW	332300 350300	Betsi Cadwaladr University Local Health Board, Wrexham Maelor Hospital, Croesnewydd Road, Wrexham, Clwyd, LL13 7TD	Betsi Cadwaladr University Local Health Board	Disposal Of Radioactive Waste (was Rsa60 Section 6).	CE0265	Date of Approval:15/3/2010 Effective from:15/3/2010 Last date of update:2015-01-01	Effective
27C	143.0	NW	332300 350300	Betsi Cadwaladr University Local Health Board, Wrexham Maelor Hospital,croesnewydd Road, Wrexham, Clwyd, LL13 7TD	Betsi Cadwaladr University Local Health Board	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	CE0281	Date of Approval:15/3/2010 Effective from:15/3/2010 Last date of update:2015-01-01	Effective

ID	Distance	Direction	NGR	Address	Operator	Type	Permission Number	Dates	Status
28D	184.0	N	332400 350400	Wrexham Maelor Hospital Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT	Wrexham Maelor Hospital Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AI4131	Date of Approval:4/11/1994 Effective from:2/12/1994 Last date of update:2015-01-01	Superseded By Variation
29D	184.0	N	332400 350400	North Wales Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT	North Wales Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	BF4768	Date of Approval:31/3/1999 Effective from:1/4/1999 Last date of update:2015-01-01	Superseded By Variation
30D	184.0	N	332400 350400	Wrexham Maelor Hospital Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT	Wrexham Maelor Hospital Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AI4131	Date of Approval:5/12/1995 Effective from:5/1/1996 Last date of update:2015-01-01	Superseded By Variation
31D	184.0	N	332400 350400	North Wales Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT	North Wales Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	BF4768	Date of Approval:1/12/2003 Effective from:1/1/2004 Last date of update:2015-01-01	Superseded By Variation
32D	184.0	N	332400 350400	North Wales Nhs Trust, Wrexham Maelor Hospital,croesnewydd Road, Wrexham, Clwyd, LL13 7TD	North Wales Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	BF4857	Date of Approval:17/12/2001 Effective from:17/12/2001 Last date of update:2015-01-01	Superseded By Variation
33D	184.0	N	332400 350400	Wrexham Maelor Hospital Nhs Trust, Wrexham Maelor Hospital,croesnewydd Road, Wrexham, Clwyd, LL13 7TD	Wrexham Maelor Hospital Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AI4115	Date of Approval:15-7-1993 Effective from:15-7-1993 Last date of update:2005-01-06	Superseded By Variation

ID	Distance	Direction	NGR	Address	Operator	Type	Permission Number	Dates	Status
34D	184.0	N	332400 350400	Wrexham Maelor Hospital Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT	Wrexham Maelor Hospital Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AI4131	Date of Approval:24/7/1995 Effective from:24/8/1995 Last date of update:2015-01-01	Superseded By Variation
35D	184.0	N	332400 350400	North Wales Nhs Trust, Wrexham Maelor Hospital,croes newydd Road, Wrexham, Clwyd, LL13 7TD	North Wales Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	BF4857	Date of Approval:6/8/2008 Effective from:6/8/2008 Last date of update:2015-01-01	Revoked/cancelled
36D	184.0	N	332400 350400	Wrexham Maelor Hospital Nhs Trust, Maelor Wrexham Hospital, Wrexham, Clwyd, LL13 7TD	Wrexham Maelor Hospital Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AG2057	Date of Approval:31/3/1991 Effective from:31/3/1991 Last date of update:2015-01-01	Revoked/cancelled
37D	184.0	N	332400 350400	North Wales Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT	North Wales Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	BF4768	Date of Approval:6/8/2008 Effective from:6/8/2008 Last date of update:2015-01-01	Revoked/cancelled
38D	184.0	N	332400 350400	North Wales Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT	North Wales Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	BF4768	Date of Approval:6/11/2007 Effective from:4/12/2007 Last date of update:2015-01-01	Superseded By Variation
39D	184.0	N	332400 350400	Wrexham Maelor Hospital Nhs Trust, Ysbyty Maelor, Wrexham, Clwyd,	Wrexham Maelor Hospital Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AG9612	Date of Approval:31/3/1991 Effective from:31/3/1991 Last date of update:2015-01-01	Revoked/cancelled
40D	184.0	N	332400 350400	Wrexham Maelor Hospital Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT	Wrexham Maelor Hospital Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AI4131	Date of Approval:6/10/1997 Effective from:6/11/1997 Last date of update:2015-01-01	Revoked/cancelled

ID	Distance	Direction	NGR	Address	Operator	Type	Permission Number	Dates	Status
41E	497.0	NW	332100 350600	Wrexham Maelor Hospital Nhs Trust, Wrexham Technology Park, Wrexham, Clwyd, LL13 7YP	Wrexham Maelor Hospital Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AL4597	Date of Approval:16/8/1994 Effective from:13/9/1994 Last date of update:2015-01-01	Revoked/cancelled

1.1.9 Records of Licensed Discharge Consents within 500m of the study site:

8

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details	
1	79.0	W	332340 350240	Address: WREXHAM RUTHIN ROAD. AMBUL.H.Q.& CO, WREXHAM RUTHIN ROAD. AMBUL.H.Q.&, RUTHIN ROAD. AMBUL.H.Q.& COUNCIL, AMBUL.H.Q.& COUNCIL OFFICES, UNKNOWN, UNKNOWN Effluent Type: UNSPECIFIED Permit Number: CM0034201 Permit Version: 1	Receiving Water: GWENFRO Status: CONSENT EXPIRED - TIME LIMIT Issue date: 22/06/1966 Effective Date: 22-Jun-1966 Revocation Date: 22/12/1992
2	114.0	W	332300 350200	Address: NEW LEGO OFFICES & WAREHOUSE WREXHA, NEW LEGO OFFICES & WAREHOUSE WRE, WREXHAM IND ESTATE WREXHAM, WREXHAM, WREXHAM, WREXHAM Effluent Type: UNSPECIFIED Permit Number: CM0088701 Permit Version: 1	Receiving Water: GWENFRO Status: CONSENT EXPIRED - TIME LIMIT Issue date: 16/04/1980 Effective Date: 16-Apr-1980 Revocation Date: 29/03/1993
3	227.0	N	332520 350420	Address: WREXHAM DISTRICT GENERAL HOSPITAL W, WREXHAM DISTRICT GENERAL HOSPITA, DISTRICT GENERAL HOSPITAL WATERY, WATERY ROAD, UNKNOWN, UNKNOWN Effluent Type: UNSPECIFIED Permit Number: CM0146501 Permit Version: 1	Receiving Water: GWENFRO Status: CONSENT EXPIRED - TIME LIMIT Issue date: 23/12/1985 Effective Date: 23-Dec-1985 Revocation Date: 18/02/1993
4A	412.0	SW	332140 349730	Address: "THE HOMESTEAD" BERSHAM ROAD WREXH, "THE HOMESTEAD" BERSHAM ROAD WR, BERSHAM ROAD WREXHAM CLWYD, WREXHAM CLWYD, WREXHAM CLWYD, CLWYD Effluent Type: UNSPECIFIED Permit Number: CM0000901 Permit Version: 1	Receiving Water: OPEN DITCH ENTERING CLYWEDOG Status: CONSENT EXPIRED - TIME LIMIT Issue date: 13/05/1955 Effective Date: 13-May-1955 Revocation Date: 21/11/1994
5A	426.0	SW	332130 349720	Address: BERSHAM ROAD THE HOMESTEAD, BERSHAM ROAD THE HOMESTEAD, THE HOMESTEAD, UNKNOWN, UNKNOWN, UNKNOWN Effluent Type: UNSPECIFIED Permit Number: CM0004101 Permit Version: 1	Receiving Water: OPEN DITCH ENTERING CLYWEDOG Status: CONSENT EXPIRED - TIME LIMIT Issue date: 25/09/1957 Effective Date: 25-Sep-1957 Revocation Date: 02/02/1994

ID	Distance	Direction	NGR	Details	
6	464.0	NE	332700 350600	Address: MAESGWYN PS, MAESGWYN PS, UNKNOWN, UNKNOWN, UNKNOWN, UNKNOWN Effluent Type: UNSPECIFIED Permit Number: CM0194101 Permit Version: 1	Receiving Water: GWENFRO Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 88) Issue date: 19/10/1989 Effective Date: 19-Oct-1989 Revocation Date: 28/03/2002
7B	486.0	NE	332710 350620	Address: MEASGWYN SEWAGE PUMPING STATION, MAESGWYN PUMPING STATION, MEASGWYN ROAD, WREXHAM, , Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: CM0194101 Permit Version: 2	Receiving Water: AFON GWENFRO Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 28/03/2002 Effective Date: 29-Mar-2002 Revocation Date: -
8B	486.0	NE	332710 350620	Address: MEASGWYN SEWAGE PUMPING STATION, MAESGWYN PUMPING STATION, MEASGWYN ROAD, WREXHAM, , Effluent Type: MISCELLANEOUS DISCHARGES - EMERGENCY DISCHARGES Permit Number: CM0194101 Permit Version: 2	Receiving Water: AFON GWENFRO Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 28/03/2002 Effective Date: 29-Mar-2002 Revocation Date: -

1.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

1.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: 0

Database searched and no data found.

1.3 Environment Agency Recorded Pollution Incidents

1.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

0

Database searched and no data found.

1.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site? 0

Database searched and no data found.

---

2. Landfill and Other Waste Sites Map

NW N NE

W E

SW S SE

Landfill and Other Waste Sites Legend

Mapping sourced from Ordnance Survey

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- Site Outline
- 250 / 500 — Search Buffers (m)
- E.A. Active Landfill
- E.A. Historic Landfill
- BGS / DoE Survey Landfill
- Historic and Planned Waste Sites
- E.A. Licensed Waste Site
- Local Authority/Historical Mapping Landfill Records

2. Landfill and Other Waste Sites

2.1 Landfill Sites

2.1.1 Records from Environment Agency landfill data within 1000m of the study site:

1

The following Environment Agency landfill records are represented as polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not show n	824.0	SW	331993 349223	Address: Esless Farm, Esless Lane, Rhostyllen, Wrexham, Clwyd, LL14 4DG Landfill Reference: 37057.0 Environmental Permitting Regulations (Waste) Reference: WIL001 Landfill Type: A6 : Landfill taking other wastes	Operator: Williams R L Status: Closure IPPC Reference: EPR Reference:

2.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site:

3

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
3A	547.0	E	333100 350000	Site Address: Parciau, Wrexham, Clwyd Waste Licence: - Site Reference: - Waste Type: Inert, Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: Wrexham Borough Council First Recorded Input: 01-Jan-1969 Last Recorded Input: 31-Dec-1972
Not show n	972.0	NW	331500 350700	Site Address: Berse Drelincourt, Berse Road, Wrexham, Lower Berse Waste Licence: Yes Site Reference: WMBC L/34 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 29-May-1981 Licence Surrendered: Licence Hold Address: - Operator: - First Recorded Input: 01-Jan-1981 Last Recorded Input: 31-Dec-1985

ID	Distance (m)	Direction	NGR	Details	
Not show n	1399.0	SE	333500 349000	Site Address: Sontley Road, Hightown, Cardiff Waste Licence: - Site Reference: - Waste Type: Inert, Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: - First Recorded Input: 01-Jan-1967 Last Recorded Input: 31-Dec-1969

2.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

0

Database searched and no data found.

2.1.4 Records of Landfills from Local Authority and Historical Mapping records within 1500m of the study site:

2

The following landfill records are represented as points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
9A	555.0	E		Parciau	Wrexham Council	Polygon
10	690.0	E		Refuse Tip	1971 mapping	Polygon

2.2 Other Waste Sites

2.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

1

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details		
2	361.0	E	332838 349908	Type of Site: Amenity Site Site Address: N/A	Planning Application Reference: N/A Date: 1990	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon

2.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:

3

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not shown	730.0	NE	332905 350785	Site Address: Mold Road, Wrexham, Clwyd, LL11 2AD Type: Metal Recycling Site (Vehicle Dismantler) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: JAC001 EPR reference: EA/EPR/LP3194FV/V002 Operator: Jacques Garage Waste Management licence No: 37037 Annual Tonnage: 4999.99	Issue Date: 29/09/1992 Effective Date: - Modified: 30/11/2001 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Expired Site Name: Jacques Garage Correspondence Address: -, -
Not shown	878.0	SW	332015 349263	Site Address: Esless Lane, Rhostyllen, Wrexham, LL14 4DG Type: Landfill taking other wastes Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WIL001 EPR reference: - Operator: Williams R L Waste Management licence No: 37057 Annual Tonnage: 0.0	Issue Date: 16/02/1993 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Esless Farm Correspondence Address: -, Esless Lane, Rhostyllen, Wrexham, LL14 4DG
Not shown	923.0	SW	331993 349223	Site Address: Esless Farm, Esless Lane, Rhostyllen, Wrexham, Clwyd, LL14 4DG Type: Landfill taking other wastes Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WIL001 EPR reference: EA/EPR/UP3194FB/A001 Operator: Williams R L Waste Management licence No: 37057 Annual Tonnage: 100000.0	Issue Date: 16/02/1993 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Esless Farm Correspondence Address: -, -

3. Current Land Use Map

NW N NE

W E

SW S SE

Current Land Use Legend

Mapping sourced from Ordnance Survey

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Site Outline

250 500 Search Buffers (m)

Current Industrial Sites

Petrol & Fuel Sites

Gas Transmission Pipeline

Electricity Transmission Cable

3. Current Land Uses

3.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 15

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	0.0	On Site	Wrexham Ambulance Station		Ruthin Road, Wrexham, LL13 7TU	Ambulance and Medical Transportation Services	Health Support Services
2	43.0	E	Electricity Sub Station		LL13	Electrical Features	Infrastructure and Facilities
3	48.0	E	Morrisons Wrexham		Ruthin Road, Offa, Wrexham, LL13 7TU	Petrol and Fuel Stations	Road and Rail
4	51.0	W	Electricity Sub Station		LL13	Electrical Features	Infrastructure and Facilities
5	65.0	E	Morrisons Wrexham		Ruthin Road, Offa, Wrexham, LL13 7TU	Vehicle Cleaning Services	Personal, Consumer and Other Services
6	82.0	E	Electricity Sub Station		LL13	Electrical Features	Infrastructure and Facilities
7	93.0	S	Electricity Sub Station		LL13	Electrical Features	Infrastructure and Facilities
8	97.0	NW	Tank		LL13	Tanks (Generic)	Industrial Features
9	115.0	NW	Electricity Sub Station		LL13	Electrical Features	Infrastructure and Facilities
10A	145.0	N	Wrexham Maelor Hospital	332374 350355	Croesnewydd Road, Wrexham Technology Park, Wrexham, LL13 7TD	Accident and Emergency Hospitals	Health Practitioners and Establishments
11A	145.0	N	Wrexham Maelor Hospital	332374 350355	Croesnewydd Road, Wrexham Technology Park, Wrexham, LL13 7TD	Hospitals	Health Practitioners and Establishments
12	183.0	NW	Tank		LL13	Tanks (Generic)	Industrial Features
13B	190.0	E	ATS Euromaster Ltd	332666 350241	Dolydd Road, Wrexham, LL13 7TE	Vehicle Parts and Accessories	Motoring
14B	191.0	E	Depot		LL13	Container and Storage	Transport, Storage and Delivery
15	193.0	S	Electricity Sub Station		LL13	Electrical Features	Infrastructure and Facilities

3.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: 2

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

ID	Distance (m)	Direction	NGR	Company	Address	LPG	Status
16	116.0	E	332596 350068	Morrisons	Morrisons Wrexham, Ruthin Road, Ruthin Road, Offa, Wrexham, Clwyd, LL13 7TU	Yes	Open
17	390.0	E	332858 349975	Total	Wrexham Service Station, Ruthin Road, Ruthin Road, Victoria Road, Wrexham, Clwyd, LL13 7TT	Not Applicable	Obsolete

3.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

3.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

4. Geology

4.1 Artificial Ground and Made Ground

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

4.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
GFSDD	GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN	SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
ALV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]

4.3 Bedrock and Solid Geology

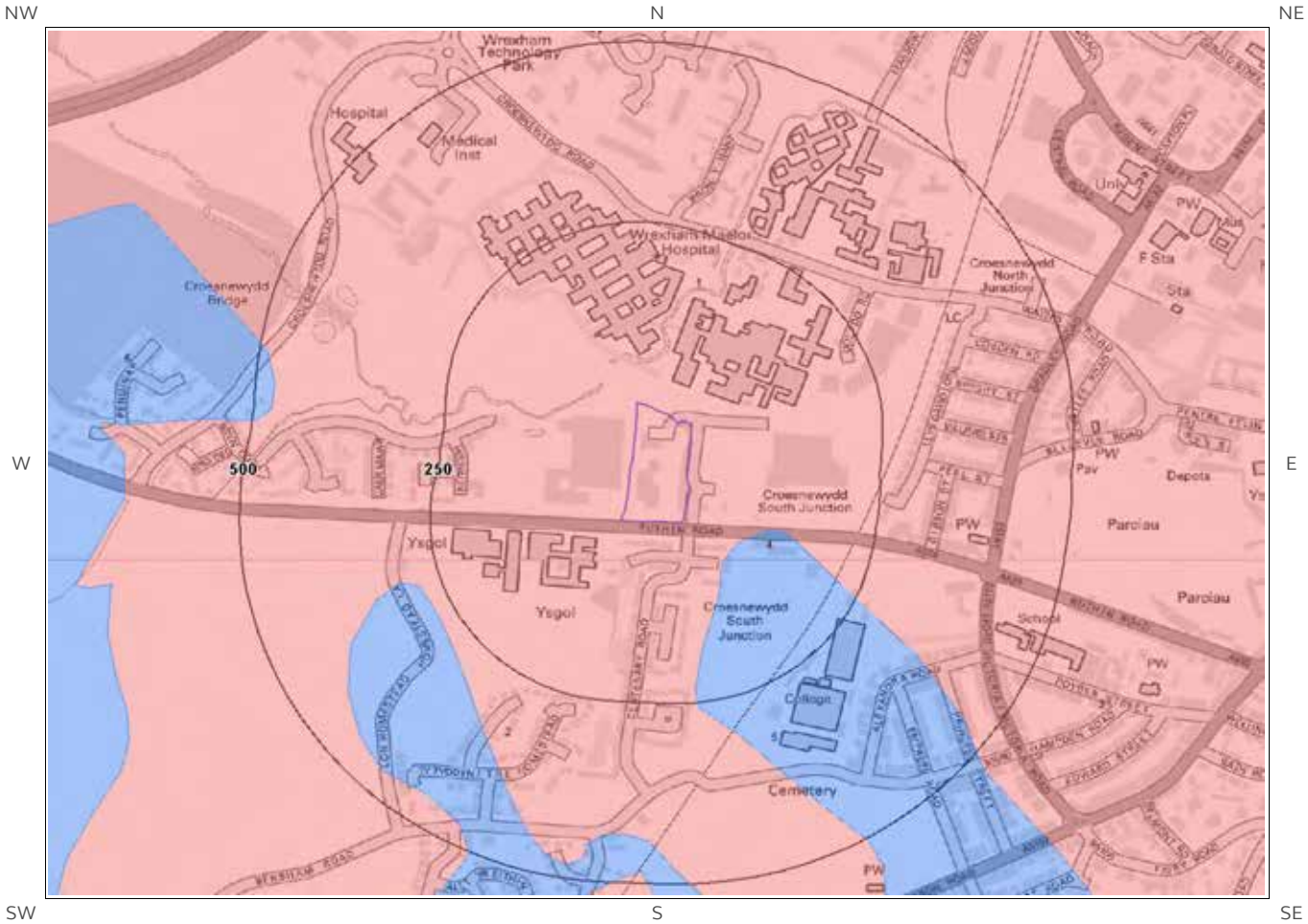
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
ETM-MDST	ETRURIA FORMATION	MUDSTONE
PLMC-MDSS	PENNINE LOWER COAL MEASURES FORMATION AND PENNINE MIDDLE COAL MEASURES FORMATION (UNDIFFERENTIATED)	MUDSTONE, SILTSTONE AND SANDSTONE

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

5. Hydrogeology and Hydrology

5a. Aquifer Within Superficial Geology



Aquifer Within Superficial Geology

Mapping sourced from Ordnance Survey

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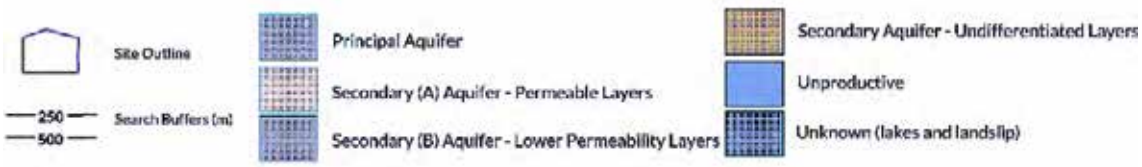

5b. Aquifer Within Bedrock Geology and Abstraction Licenses

NW N NE

W E

SW S SE

Aquifer Within Bedrock Geology and Abstraction Licenses

Mapping sourced from Ordnance Survey

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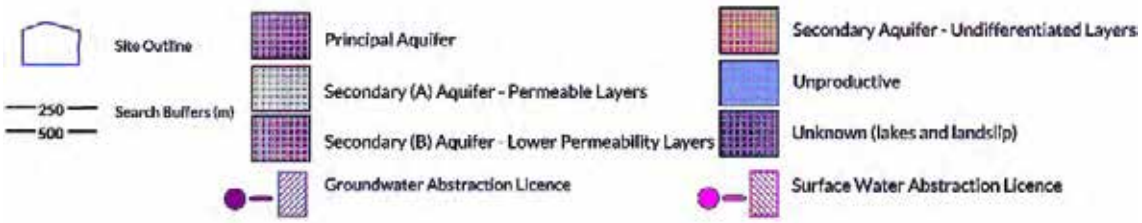

5c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses

NW N NE

W E

SW S SE

Hydrogeology-Source Protection Zones and Potable Water Abstraction Licenses

Mapping sourced from Ordnance Survey

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Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2 - Outer Catchment

Site Outline

Source Protection Zone 3 - Total Catchment

250
500
Search Buffers (m)

Source Protection Zone 4 - Zone of Special Interest

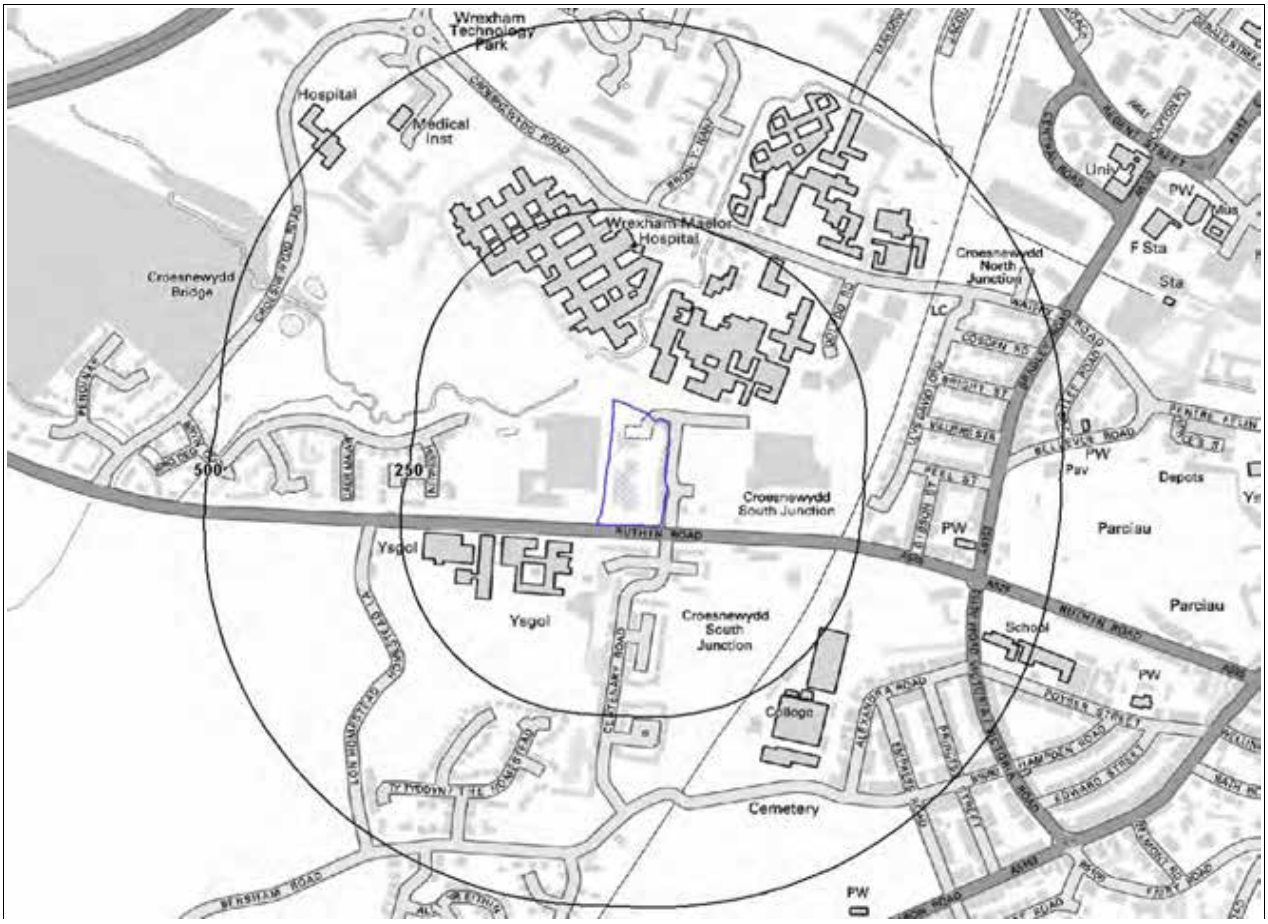
Potable Water Abstraction Licence

5d. Hydrogeology - Source Protection Zones within confined aquifer

NW N NE

W E

SW S SE



Hydrogeology Source Protection Zones

Mapping sourced from Ordnance Survey

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Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2C - Outer Catchment within Confined Aquifer

Source Protection Zone 3C - Total Catchment within Confined Aquifer

Potable Water Abstraction Licence

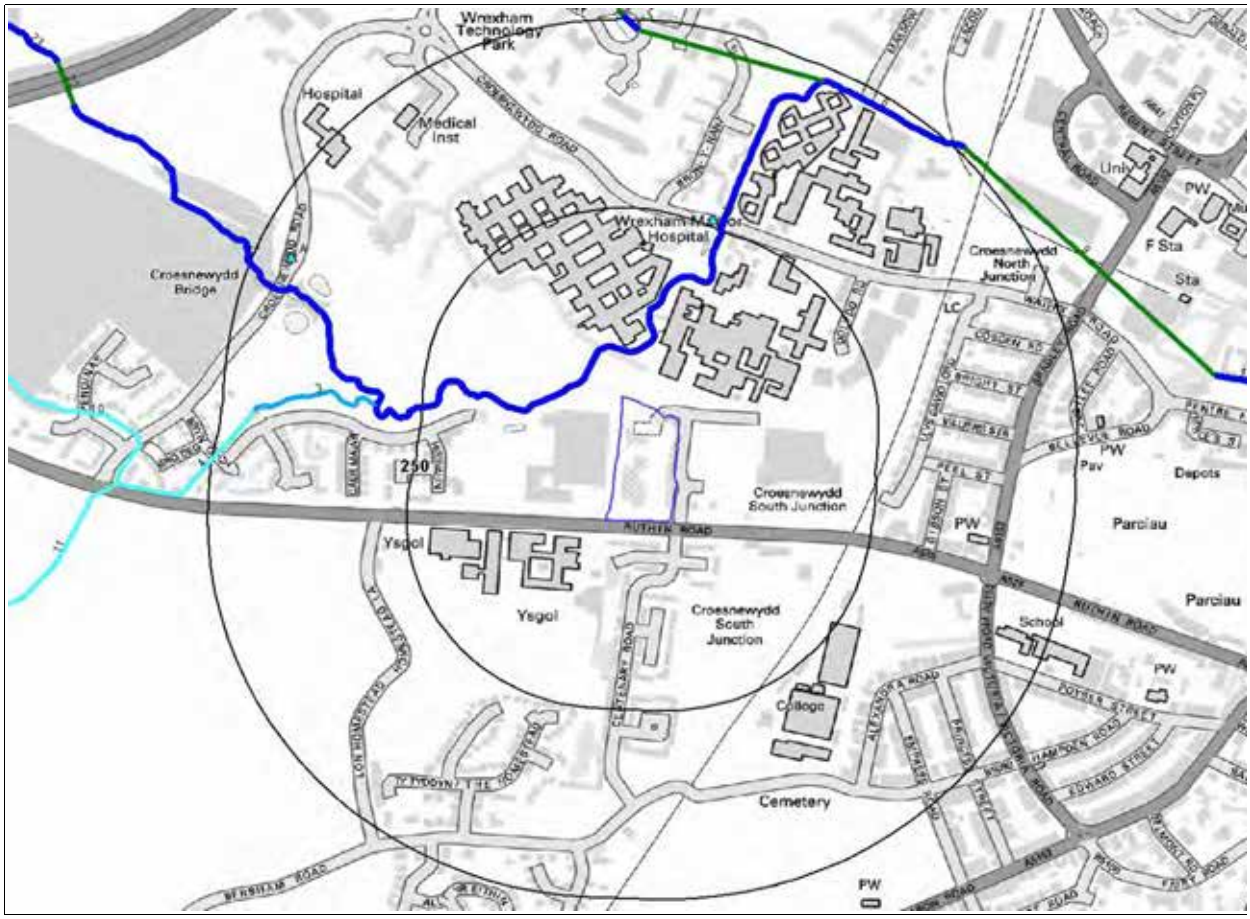
Site Outline

250 500 Search Buffers (m)

5e. Hydrology – Detailed River Network and River Quality

NW N NE

W E



SW S SE

Hydrology – Detailed River Network and River Quality

Mapping sourced from Ordnance Survey

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Site Outline

250 Search Buffers (m)
500

Primary River
Secondary River
Tertiary River
Lake/Reservoir
Underground River (inferred)
General Quality Assessment: Biology
General Quality Assessment: Chemistry

Canal
Canal Tunnel
Culvert
Multiple Channel Culvert
Underground River (Potential Sewer)
Underground River (local knowledge)

5. Hydrogeology and Hydrology

5.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (5a):

ID	Distance (m)	Direction	Designation	Description
1	0.0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	51.0	S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
4	76.0	SE	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
5	76.0	SE	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
3	180.0	E	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
6	475.0	W	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

5.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	Designation	Description
1	0.0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

ID	Distance (m)	Direction	Designation	Description
2	51.0	S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

5.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	NGR	Name	Details	
3	502.0	N	332610 350681	Carlsberg Tetley Brewing Ltd.	Licence No: 24/67/7/0012 Details: Process water Direct Source: Eaw Groundwater Point: Well No.2 Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 319 Original Start Date: 25/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 4/5/1970 Version End Date:
4	537.0	N	332630 350710	Carlsberg Tetley Brewing Ltd.	Licence No: 24/67/7/0012 Details: Process water Direct Source: Eaw Groundwater Point: Well No.3 Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 319 Original Start Date: 25/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 4/5/1970 Version End Date:
Not shown	592.0	N	332600 350780	Carlsberg Tetley Brewing Ltd.	Licence No: 24/67/7/0012 Details: Process water Direct Source: Eaw Groundwater Point: Well No.1 Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 319 Original Start Date: 25/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 4/5/1970 Version End Date:

5.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? Yes

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	NGR	Name	Details	
6	67.0	W	332350 350230	Rees	Licence No: 24/67/7/0135 Details: Spray Irrigation - Direct Direct Source: Eaw Surface Water Point: River Gwenfro Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: 328 Original Start Date: 24/2/1967 Expiry Date: - Issue No: 100 Version Start Date: 28/1/1983 Version End Date:
7	225.0	W	331800 350100	Morris	Licence No: 24/67/7/0135 Details: Spray Irrigation - Direct Direct Source: Eaw Surface Water Point: Tributary Of River Gwenfro Data Type: Line	Annual Volume (m^3): 4546 Max Daily Volume (m^3): 511.43 Application No: - Original Start Date: 24/2/1967 Expiry Date: - Issue No: 101 Version Start Date: 13/6/2003 Version End Date:
8	635.0	W	331100 350060	Morris	Licence No: 24/67/7/0135 Details: Spray Irrigation - Direct Direct Source: Eaw Surface Water Point: Tributary Of River Gwenfro Data Type: Line	Annual Volume (m^3): 4546 Max Daily Volume (m^3): 511.43 Application No: - Original Start Date: 24/2/1967 Expiry Date: - Issue No: 101 Version Start Date: 13/6/2003 Version End Date:
9	744.0	E	333230 350220	Wrexham County Borough	Licence No: 24/67/7/0147 Details: Effluent/Slurry Dilution Direct Source: Eaw Surface Water Point: River Gwenfro Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: L30 Original Start Date: 24/2/1967 Expiry Date: - Issue No: 100 Version Start Date: 24/2/1967 Version End Date:
Not shown	1040.0	NW	331190 350560	Morris	Licence No: 24/67/7/0135 Details: Spray Irrigation - Direct Direct Source: Eaw Surface Water Point: River Gwenfro Data Type: Line	Annual Volume (m^3): 4546 Max Daily Volume (m^3): 511.43 Application No: - Original Start Date: 24/2/1967 Expiry Date: - Issue No: 101 Version Start Date: 13/6/2003 Version End Date:
Not shown	1751.0	SE	333340 348530	Wrexham Maelor Borough Council (Rhostyllen)	Licence No: 24/67/7/0202 Details: Water Wheels Not Used For Power Direct Source: Eaw Surface Water Point: Afon Clywedog Data Type: Point	Annual Volume (m^3): 14400 Max Daily Volume (m^3): 144 Application No: C219/1622 Original Start Date: 7/8/1989 Expiry Date: - Issue No: 100 Version Start Date: 7/8/1989 Version End Date:

ID	Distance (m)	Direction	NGR	Name	Details	
Not shown	1790.0	SE	333400 348520	The National Trust	Licence No: 24/67/7/0169 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household Direct Source: Eaw Surface Water Point: Spring Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: 314&315 Original Start Date: 14/6/1968 Expiry Date: - Issue No: 100 Version Start Date: 6/5/1977 Version End Date:
Not shown	1871.0	S	332440 348180	The National Trust	Licence No: 24/67/7/0169 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household Direct Source: Eaw Surface Water Point: Spring Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: 314&315 Original Start Date: 14/6/1968 Expiry Date: - Issue No: 100 Version Start Date: 6/5/1977 Version End Date:

5.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? Yes

The following Potable Water Abstraction Licences records are represented as points, lines and regions on the SPZ and Potable Water Abstraction Licences Map (5c):

ID	Distance (m)	Direction	NGR	Name	Details	
Not show n	1790.0	SE	333400 348520	The National Trust	Licence No: 24/67/7/0169 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household Direct Source: Eaw Surface Water Point: Spring Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 314&315 Original Start Date: 14/6/1968 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not show n	1871.0	S	332440 348180	The National Trust	Licence No: 24/67/7/0169 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household Direct Source: Eaw Surface Water Point: Spring Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 314&315 Original Start Date: 14/6/1968 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:

5.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? No

Database searched and no data found.

5.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site?

No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

5.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency information on groundwater vulnerability and soil leaching potential within 500m of the study site? Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
0	On Site	Minor Aquifer/High Leaching Potential	H2	Deep, permeable, coarse textured soils which readily transmit a wide range of pollutants because of their rapid drainage and low attenuation potential.
51	S	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
134	SW	Minor Aquifer/High Leaching Potential	H2	Deep, permeable, coarse textured soils which readily transmit a wide range of pollutants because of their rapid drainage and low attenuation potential.

5.9 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site? Yes

5.9.1 Biological Quality:

Biological Quality data describes water quality in terms of 83 groups of macroinvertebrates, some of which are pollution sensitive. The results are graded from A ('Very Good') to F ('Bad').

The following Biological Quality records are shown on the Hydrology Map (5d):

ID	Distance (m)	Direction	NGR	River Quality Grade	Biological Quality Grade				
					2005	2006	2007	2008	2009
32A	454.0	NW	332000 350400	River Name: Gwenfro Reach: Hospital - Conf. Trib. Nr. South Sea End/Start of Stretch: End of Stretch NGR	C	C	C	C	C
Not shown	1220.0	E	333700 350000	River Name: Gwenfro Reach: Conf.r.clywedog - Willow Road Wrexham End/Start of Stretch: Start of Stretch NGR	D	D	C	C	C
Not shown	1391.0	S	332800 348700	River Name: Clywedog (dee) Reach: Conf.r.gwenfro -conf.black Bk.erddig Pk End/Start of Stretch: Start of Stretch NGR	A	A	A	B	B
Not shown	1391.0	S	332800 348700	River Name: Clywedog (dee) Reach: Conf.black Bk.erddig Pk-conf.trib. End/Start of Stretch: End of Stretch NGR	B	B	B	B	B
Not shown	1391.0	S	332800 348700	River Name: Black Brook Reach: Conf.r.clywedog - B5426 Rd.br. End/Start of Stretch: End of Stretch NGR	C	C	A	A	A

5.9.2 Chemical Quality:

Chemical quality data is based on the General Quality Assessment Headline Indicators scheme (GQAHI). In England, each chemical sample is measured for ammonia and dissolved oxygen. In Wales, the samples are measured for biological oxygen demand (BOD), ammonia and dissolved oxygen. The results are graded from A ('Very Good') to F ('Bad').

The following Chemical Quality records are shown on the Hydrology Map (5d):

					Chemical Quality Grade				
ID	Distance (m)	Direction	NGR	River Quality Grade	2005	2006	2007	2008	2009
37	258.0	N	332530 350450	River Name: Gwenfro Reach: Hospital - Conf. Trib. Nr. South Sea End/Start of Stretch: Sample Point NGR	A	B	B	C	-
38A	454.0	NW	332000 350400	River Name: Gwenfro Reach: Hospital - Conf. Trib. Nr. South Sea End/Start of Stretch: End of Stretch NGR	A	B	B	C	-
39A	454.0	NW	332000 350400	River Name: Gwenfro Reach: Willow Rd.wrexham - Hospital End/Start of Stretch: Start of Stretch NGR	B	B	B	B	-
Not shown	724.0	S	332495 349327	River Name: Clywedog Reach: Conf.black Bk.erddig Pk-conf.trib. End/Start of Stretch: Sample Point NGR	A	A	A	A	-
Not shown	1220.0	E	333700 350000	River Name: Gwenfro Reach: Willow Rd.wrexham - Hospital End/Start of Stretch: End of Stretch NGR	B	B	B	B	-
Not shown	1220.0	E	333700 350000	River Name: Gwenfro Reach: Conf.r.clywedog - Willow Road Wrexham End/Start of Stretch: Start of Stretch NGR	B	B	B	B	-
Not shown	1294.0	S	332672 348773	River Name: Black Brook Reach: Conf.r.clywedog - B5426 Rd.br. End/Start of Stretch: Sample Point NGR	A	A	A	A	-
Not shown	1322.0	E	333800 349970	River Name: Gwenfro Reach: Willow Rd.wrexham - Hospital End/Start of Stretch: Sample Point NGR	B	B	B	B	-
Not shown	1391.0	S	332800 348700	River Name: Clywedog Reach: Conf.r.gwenfro -conf.black Bk.erddig Pk End/Start of Stretch: Start of Stretch NGR	A	A	A	A	-
Not shown	1391.0	S	332800 348700	River Name: Black Brook Reach: Conf.r.clywedog - B5426 Rd.br. End/Start of Stretch: End of Stretch NGR	A	A	A	A	-
Not shown	1391.0	S	332800 348700	River Name: Clywedog Reach: Conf.black Bk.erddig Pk-conf.trib. End/Start of Stretch: End of Stretch NGR	A	A	A	A	-

5.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site? Yes

The following Detailed River Network records are represented on the Hydrology Map (5e):

ID	Distance (m)	Direction	Details	
1	55.0	NW	River Name: River Gwenfro Welsh River Name: Afon Gwenfro Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
2	302.0	W	River Name: River Gwenfro Welsh River Name: Afon Gwenfro Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
3	306.0	W	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
4	459.0	W	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
5	472.0	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
6	481.0	NE	River Name: River Gwenfro Welsh River Name: Afon Gwenfro Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
7	486.0	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined

5.11 Surface Water Features

Are there any surface water features within 250m of the study site? Yes

The following surface water records are not represented on mapping:

Distance (m)	Direction
53.0	NW
58.0	N
116.0	N
119.0	W

6. Environment Agency Risk of Flooding from Rivers and the Sea (RoFRaS) Map

NW N NE

W E

SW S SE

Environment Agency Risk of Flooding From Rivers and the Sea (RoFRaS)

Mapping sourced from Ordnance Survey

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Site Outline

250 500 Search Buffers (m)

RoFRaS Rating

Very Low

Low

Medium

High

Flood Defences

Areas used for Flood Storage

Areas Benefiting from Flood Defences

Flood Defences

6. Flooding

6.1 Risk of Flooding from Rivers and the Sea (RoFRaS)

What is the risk of flooding at the centre of the study site? Low

What is the highest risk of flooding within 25m of the centre of the study site? Low

The Environment Agency RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid as used by many of the insurance companies. RoFRaS data is based on a 50m grid system, with the flood rating at the centre of the grid calculated and given below. The data considers the probability that the flood defences will overtop or breach, and the distance from the river or the sea.

RoFRaS data for the study site indicates the property or an area within 25m has a Low (greater than 1 in 1000 but less than 1 in 100) chance of flooding in any given year.

The following floodplain records within 50m of the study site are represented on the River and Coastal Flood Risk Map above:

ID	Distance (m)	Direction	Rofras Flood Risk
1	0	On Site	Low
2	33	N	High
3A	34	N	High
4B	39	N	High

6.2 Flood Defences

Are there any Flood Defences within 250m of the study site? No

Database searched and no data found.

6.3 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

6.4 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

6.5 Groundwater Flooding Susceptibility Areas

6.5.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site?

Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Superficial Deposits Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

6.5.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Potential at Surface

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

6.6 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result? High

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

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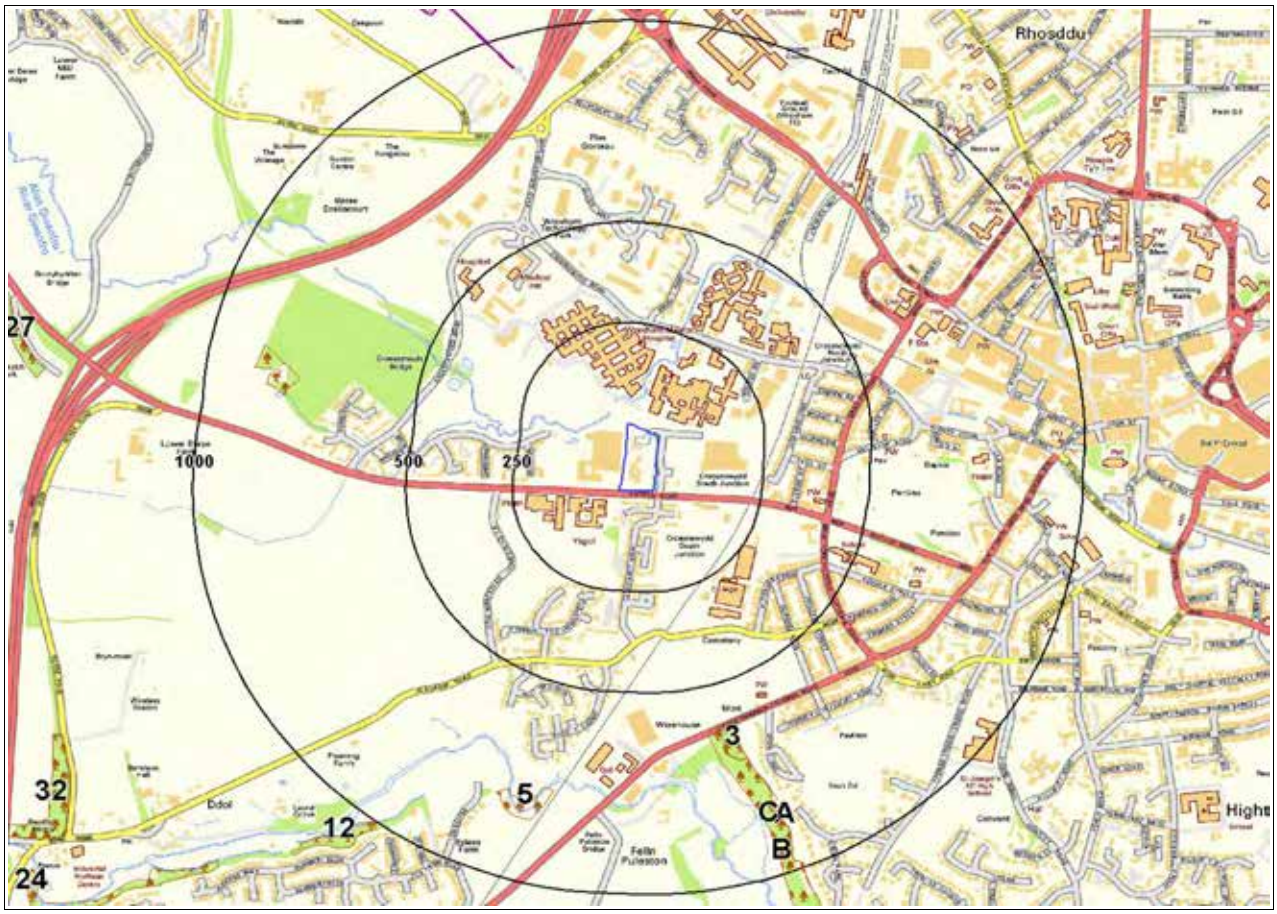
7. Designated Environmentally Sensitive Sites Map

NW N NE

W E



SW S SE

Designated Environmentally Sensitive Sites Map

Mapping sourced from Ordnance Survey

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Site Outline

100 250 Search Buffers (m)

AONB

National Park

SSSI

Special Protection Areas

Nitrate Vulnerable Zones

Green Belt

Environmentally Sensitive Areas

Special Areas of Conservation

World Heritage Sites

Nitrate Sensitive Areas

Ancient Woodland

National Nature Reserve

Local Nature Reserves

Ramsar Sites

7. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

7.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

1

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
1	921.0	N	GATEWEN MARSH	Natural Resources Wales

7.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

7.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

7.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

7.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

7.6 Records of Ancient Woodland within 2000m of the study site:

57

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
2C	603.0	S	Unknown	Ancient and Semi-Natural Woodland
3	610.0	S	Unknown	Ancient and Semi-Natural Woodland
4	740.0	S	Unknown	Ancient and Semi-Natural Woodland
5	755.0	S	Unknown	Ancient and Semi-Natural Woodland
6	777.0	W	Unknown	Restored Ancient Woodland Site
7A	852.0	S	Unknown	Ancient and Semi-Natural Woodland
8A	912.0	S	Unknown	Ancient and Semi-Natural Woodland
9B	928.0	S	Unknown	Ancient and Semi-Natural Woodland
10B	974.0	S	Unknown	Ancient and Semi-Natural Woodland
11B	985.0	S	Unknown	Ancient and Semi-Natural Woodland
12	1003.0	SW	Unknown	Ancient and Semi-Natural Woodland
13B	1018.0	S	Unknown	Ancient and Semi-Natural Woodland
14C	1067.0	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1155.0	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1196.0	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1220.0	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1262.0	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1269.0	SE	Unknown	Restored Ancient Woodland Site
Not shown	1278.0	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1289.0	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1295.0	S	Unknown	Restored Ancient Woodland Site
Not shown	1296.0	S	CISTERN/BIG WOODS	Ancient and Semi-Natural Woodland
24	1316.0	SW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1347.0	S	Unknown	Restored Ancient Woodland Site
Not shown	1366.0	SE	Unknown	Ancient and Semi-Natural Woodland
27	1373.0	W	Unknown	Restored Ancient Woodland Site
Not shown	1401.0	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1416.0	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1426.0	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1435.0	SE	Unknown	Ancient and Semi-Natural Woodland
32	1440.0	SW	Unknown	Restored Ancient Woodland Site
Not shown	1468.0	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1482.0	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1499.0	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1499.0	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1520.0	SE	Unknown	Ancient and Semi-Natural Woodland

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
Not shown	1532.0	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1554.0	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1558.0	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1596.0	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1661.0	W	Unknown	Ancient Replanted Woodland
Not shown	1668.0	S	CISTERN/BIG WOODS	Ancient and Semi-Natural Woodland
Not shown	1692.0	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1700.0	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1719.0	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1765.0	SW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1768.0	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1847.0	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1864.0	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1906.0	SW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1914.0	S	Unknown	Restored Ancient Woodland Site
Not shown	1922.0	SE	CISTERN/BIG WOODS	Ancient and Semi-Natural Woodland
Not shown	1924.0	SE	CISTERN/BIG WOODS	Ancient and Semi-Natural Woodland
Not shown	1938.0	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1947.0	W	Unknown	Ancient and Semi-Natural Woodland
Not shown	1948.0	W	Unknown	Restored Ancient Woodland Site
Not shown	1991.0	SW	Unknown	Ancient and Semi-Natural Woodland

7.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

0

Database searched and no data found.

7.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

7.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

7.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

7.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

7.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

7.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

0

Database searched and no data found.

7.14 Records of Green Belt land within 2000m of the study site:

0

Database searched and no data found.

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8. Natural Hazards Findings

8.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a Groundsure GeoInsight, available from our website. The following information has been found:

8.1.1 Shrink Swell

What is the maximum Shrink-Swell*[*] hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

8.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

* This indicates an automatically generated 50m buffer and site.

8.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

8.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site? Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

8.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

8.1.6 Running Sand

What is the maximum Running Sand*[*] hazard rating identified on the study site? Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property - no significant increase in insurance risk due to running sand problems is likely.

* This indicates an automatically generated 50m buffer and site.

9. Mining

9.1 Coal Mining

Are there any coal mining areas within 75m of the study site? Yes

The following coal mining information provided by the Coal Authority is not represented on Mapping:

Distance	Direction	Details
0.0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

9.2 BGS Non Coal Mining Hazards

What is the potential for undermining as a result of underground mineral extraction, excluding coal and minerals extracted as a consequence of coal mining? Highly Unlikely

The following non-coal mining information is provided by the BGS:

Distance	Direction	Name	Commodity	Assessment of likelihood
0	On Site	Not available	Vein Mineral	Occasional minor mining may have occurred but of restricted extent.
6	NW	Not available	Iron Ore (Bedded)	Rare and localised small scale mining may have occurred.

9.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No

Guidance: No Guidance Required.

Contact Details

EmapSite
Telephone: 0118 9736883
sales@emapsite.com

British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email: **enquiries@bgs.ac.uk**
Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries

Environment Agency

National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 08708 506 506
Web:**www.environment-agency.gov.uk**
Email:**enquiries@environment-agency.gov.uk**

Public Health England

Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
www.gov.uk/phe
Email:**enquiries@phe.gov.uk**
Main switchboard**: 020 7654 8000**

The Coal Authority

200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk

Ordnance Survey

Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505

Local Authority
Authority: Wrecsam - Wrexham County Borough Council
Phone: 01978 292 000
Web: http://www.wrexham.gov.uk/
Address: The Guildhall, Wrexham, Wrexham, LL11 1AY

Gemapping PLC

Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444

Acknowledgements: Site of Special Scientific Interest, National Nature Reserve, Ramsar Site, Special Protection Area, Special Area of Conservation data is provided by, and used with the permission of, Natural England who retain the Copyright and Intellectual Property Rights for the data.
PointX © Database Right/Copyright, Thomson Directories Limited © Copyright Link Interchange Network Limited © Database Right/Copyright and Ordnance Survey © Crown Copyright and/or Database Right. All Rights Reserved. Licence Number [03421028].
This report has been prepared in accordance with the Groundsure Ltd standard Terms and Conditions of business for work of this nature.

Standard Terms and Conditions

1 Definitions

I**n these terms and conditions unless the context otherwise requires:**

"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.

"Client" means the party or parties entering into a Contract with Groundsure.

"Commercial" means any building or property which is not Residential.

"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by Groundsure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

"Support Services" means Support Services provided by Groundsure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Contract" means the contract between Groundsure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

"Third Party Data Provider" means any third party providing Third Party Content to Groundsure.

"Data Reports" means reports comprising factual data with no accompanying interpretation.

"Fees" has the meaning set out in clause 5.1.

"Groundsure" means Groundsure Limited, a company registered in England and Wales under number 03421028.

"Groundsure Materials" means all materials prepared by Groundsure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.

"Order" means an electronic, written or other order form submitted by the Client requesting Services from Groundsure in respect of a specified Site.

"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

"Order Website" means the online platform through which Orders may be placed by the Client and accepted by Groundsure.

"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.

"Residential" means any building or property used as or intended to be used as a single dwelling.

"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by Groundsure.

"Services" means any Report, Mapping and/or Support Services which Groundsure has agreed to provide by accepting an Order pursuant to clause 2.6.

"Site" means the area of land in respect of which the Client has requested Groundsure to provide the Services.

"Third Party Content" means data, database information or other information which is provided to Groundsure by a Third Party Data Provider.

"User Guide" means the user guide, as amended from time to time, available upon request from Groundsure and on the website (www.Groundsure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 Groundsure agrees to provide the Services in accordance with the Contract.

2.2 Groundsure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of Groundsure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, Groundsure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and Groundsure will have no liability therefor. In addition you acknowledge and agree that Groundsure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 Groundsure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by Groundsure. Groundsure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by Groundsure. Groundsure's acceptance of an Order shall be binding only when made in writing and signed by Groundsure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to Groundsure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to Groundsure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as Groundsure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable Groundsure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the Groundsure Materials, or use the Groundsure Materials in a manner for which they were not intended. The Client may make the Groundsure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that Groundsure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1The Client acknowledges that the Services provided by Groundsure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by Groundsure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

(i) the Beneficiary,

(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),

(iv) the first purchaser or first tenant of the Site, and

(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by Groundsure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1Groundsure shall charge and the Client shall pay fees at the rate and

frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by Groundsure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").

5.2 The Client shall pay all outstanding Fees to Groundsure in full without deduction, counterclaim or set off within 30 days of the date of Groundsure's invoice or such other period as may be agreed in writing between Groundsure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of Groundsure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

(i) full payment of all relevant Fees and

(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the Groundsure Materials.

6.2 All Intellectual Property in the Groundsure Materials are and shall remain owned by Groundsure or Groundsure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the Groundsure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to Groundsure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the Groundsure Materials in order to advise the Beneficiary in a professional capacity. However, Groundsure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify Groundsure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7.Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of Groundsure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by Groundsure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 Groundsure shall not be liable for

(i) loss of profits;

(ii) loss of business;

(iii) depletion of goodwill and/or similar losses;

(iv) loss of anticipated savings;

(v) loss of goods;

(vi) loss of contract;

(vii) loss of use;

(viii) loss or corruption of data or information;

(ix) business interruption;

(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the Groundsure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the Groundsure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of Groundsure's internet ordering service.

7.5 Groundsure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 Groundsure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of Groundsure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against Groundsure in relation to the Services or other matters arising pursuant to the Contract.

8 Groundsure's right to suspend or terminate

8.1 If Groundsure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, Groundsure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 Groundsure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to Groundsure within 30 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon Groundsure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

(a) supplied to the Client's specification(s) and in any event

(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) Groundsure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in Groundsure's possession or control; and

(ii) the Client shall pay to Groundsure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay Groundsure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of Groundsure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to Groundsure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through Groundsure.

12.3 Groundsure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of Groundsure.

12.4 No failure on the part of Groundsure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 Groundsure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;

(ii) fire, storm, flood, tempest or epidemic;

(iii) Acts of God or the public enemy;

(iv) riot, civil commotion or war;

(v) strikes, labour disputes or industrial action;

(vi) acts or regulations of any governmental or other agency;

(vii) suspension or delay of services at public registries by Third Party Data Providers;

(viii) changes in law; or

(ix) any other reason beyond Groundsure's reasonable control.

In the event that Groundsure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then Groundsure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 Groundsure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at Groundsure who will respond in a timely manner.

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law.

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APPENDIX D
Coal Authority Report

The Coal Authority

Issued by:
The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0345 762 6848 DX 716176 MANSFIELD 5

BROWNFIELD SOLUTIONS LIMITED
WYCHWOOD HOUSE
1 QUEEN STREET
NORTHWICH
CHESHIRE
CW9 5JL

Our reference:	**51000892491001**
Your reference:	**C2917/3252**
Date of your enquiry:	**05 June 2015**
Date we received your enquiry:	**05 June 2015**
Date of issue:	**05 June 2015**

This report is for the property described in the address below and the attached plan.

Non-Residential Coal Authority Mining Report

RUTHIN ROAD, WREXHAM, LL13 7TU

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	See comments below
Brine Compensation District	No

Information from the Coal Authority

Underground coal mining

Past

The property is in the likely zone of influence from workings in 3 seams of coal at 240m to 340m depth, and last worked in 1932.

Any ground movement from these coal workings should have stopped by now.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.

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© The Coal Authority --

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

Coal mining geology

The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

Opencast coal mining

Past

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of support

The property is in an area for which notices of entitlement to withdraw support were published in 1974, 1976.

The property is not in an area for which a notice has been given under section 41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

Working facilities orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to owners of former copyhold land

The property is not in an area for which a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

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Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional Remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

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Location map

Approximate position of property

Enquiry boundary

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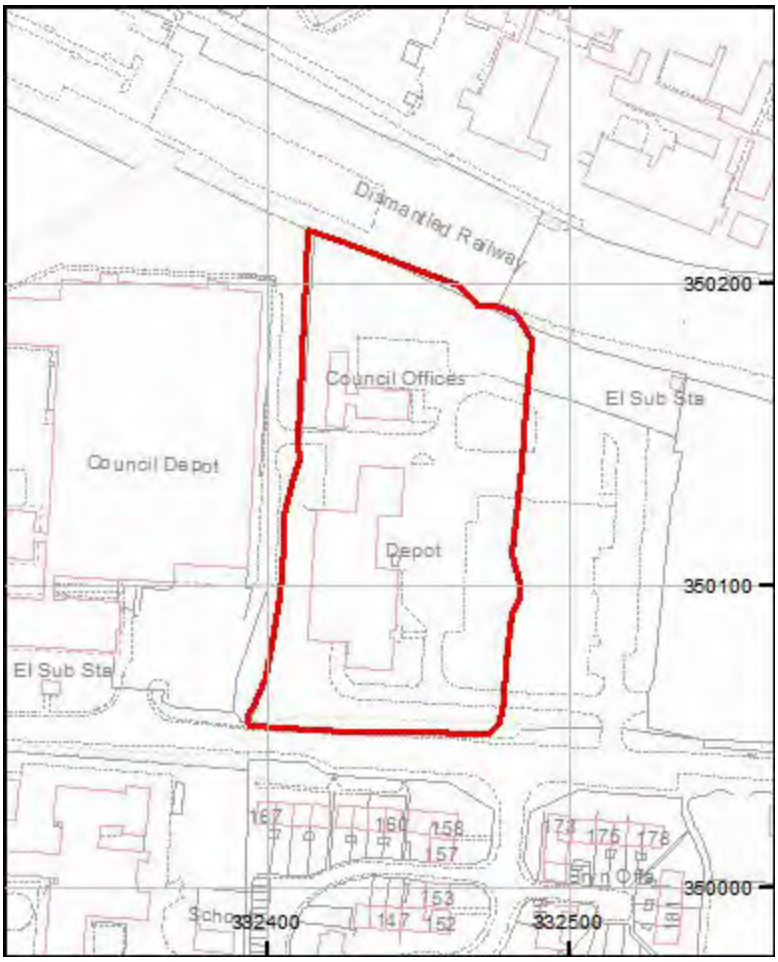

Key

Approximate position of enquiry boundary shown

Mapping sourced from Ordnance Survey

APPENDIX E
BGS Borehole Records

HOLST & CO. LTD.

SITE INVESTIGATION DEPT.

5-7 NEW YORK ROAD

LEEDS 2

SJ 35 SW 846

3248 5009

Contract No. 18209/B539

Location Ruthin Road - Wrexham

Client Denbighshire County Architect

Borehole No. 1

Ground Level 308.1

Date 18.1.66

BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c. lb./sq. ft.	Ø deg.	m.c. %	γ lb./cu. ft.	N
Topsoil		3'0"	3'0"						
Sand and Gravel		10'0"	7'0"	4'0" I					4
				9'0" I					7
Firm Brown Sandy Clay		16'0"	6'0"	14'6" ▯	1800			132	

Water struck 4'0"

Final Standing Level 4'0"

Undisturbed Sample ▯
Disturbed Sample ○
Water Sample △
Penetration Test I

c = Cohesion
Ø = Angle of Internal Friction
m.c = Moisture Content
γ = Bulk Density
N = Standard Penetration Value

Water levels may be subject to seasonal or tidal variation and should not be taken as constant

HOLST & CO. LTD.

SITE INVESTIGATION DEPT.

5-7 NEW YORK ROAD

LEEDS 2

SJ 35 SW 847

3243 5011

Contract No. 18209/B539

Location Ruthin Road - Wrexham

Client Denbighshire County Architect

Borehole No. 2

Ground Level 307.8

Date 18.1.66

BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c lb./sq. ft.	Ø deg.	m.c. %	γ lb./cu. ft.	N
Topsoil		1'6"	1'6"						
Firm Brown Sandy Clay Stiff below 5'				3'6" ▯	3000		19	130	
			8'6"	8'6" ▯	4900		17	134	
		10'0"							

Water struck None

Final Standing Level

Undisturbed Sample ▯
Disturbed Sample o
Water Sample Δ
Penetration Test I

c = Cohesion
Ø = Angle of Internal Friction
m.c = Moisture Content
γ = Bulk Density
N = Standard Penetration Value

Water levels may be subject to seasonal or tidal variation and should not be taken as constant

HOLST & CO. LTD.

, SITE INVESTIGATION DEPT.
5-7 NEW YORK ROAD
LEEDS 2

SJ 35 SW
848
3244 5013

Contract No. 18209/B539
Location Ruthin Road + Wrexham
Client Denbighshire County Architect

Borehole No. 3
Ground Level 309.0
Date 18.1.66

BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c. lb./sq. ft.	Ø deg.	m.c. %	γ lb./cu. ft.	N
Topsoil		2'0"	2'0"						
Fine Red Brown Sand		4'0"	2'0"						
Firm Red Brown Sandy silt		8'0"	4'0"	5'0" I					12
Firm Brown Sandy Clay - stiff below 10'		12'0"	4'0"	9'0" ▯	2700		23	125	
Sand and Gravel		15'0"	3'0"	13'6" I					20

Water struck Slight seepage between 2' & 4' Real Standing Level

Undisturbed Sample ▯
Disturbed Sample ○
Water Sample Δ
Penetration Test I

c = Cohesion
Ø = Angle of Internal Friction
m.c = Moisture Content
γ = Bulk Density
N = Standard Penetration Value

Water levels may be subject to seasonal or tidal variation and should not be taken as constant

HOLST & CO. LTD.

SITE INVESTIGATION DEPT.

5-7 NEW YORK ROAD

LEEDS 2

SJ 35SW 849

3248 5014

Contract No. 18209/B539

Location Ruthin Road - Wrexham

Client Denbighshire County Architect

Borehole No. 4

Ground Level 299.0

Date 18.1.66

BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c. lb./sq. ft.	Ø deg.	m.c. %	γ lb./cu. ft.	N
Topsoil and fill		3'0"	3'0"						
Stiff Brown Sandy Clay		7'6"	4'6"	5'0" ▯	2900		14	136	
Sand & Gravel		11'0"	3'6"	10'0" I					6
Firm Brown clay - becoming stiff below 14'0"		16'6"	5'6"	15'0" ▯	2450		16	134	

Water struck 7'6"

Final Standing Level 4'6"

Undisturbed Sample ▯
Disturbed Sample o
Water Sample Δ
Penetration Test I

c = Cohesion
Ø = Angle of Internal Friction
m.c = Moisture Content
γ = Bulk Density
N = Standard Penetration Value

Water levels may be subject to seasonal or tidal variation and should not be taken as constant

British Geological Survey

SJ 35 SW 851
3248 5008

HOLST & CO. LTD.

SITE INVESTIGATION DEPT.
5-7 NEW YORK ROAD
LEEDS 2

Contract No. 18209/B539
Location Ruthin Road - Wrexham
Client Denbighshire County Architect

Borehole No. 6
Ground Level 304.5
Date 18.1.66

BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c. lb./sq. ft.	Ø deg.	m.c. %	y lb./cu. ft.	N
Topsoil		1'0"	1'0"						
Firm Brown sandy clay		6'0"	5'0"	3'6" ▯	2450		20	129	
Firm red-brown silt with pockets of moist sand and bands of clay		15'0"	9'0"	10'0" I					10
Sand and Gravel		16'6"	1'6"	15'0" I					28

Water struck None

Final Standing Level

Undisturbed Sample ▯
Disturbed Sample o
Water Sample Δ
Penetration Test I

c = Cohesion
Ø = Angle of Internal Friction
m.c = Moisture Content
y = Bulk Density
N = Standard Penetration Value

Water levels may be subject to seasonal or tidal variation and should not be taken as constant

HOLST & CO. LTD.

SITE INVESTIGATION DEPT.

5-7 NEW YORK ROAD

LEEDS 2

SJ 35 SW 852
3251 5014

Contract No. 18209/B539

Location Ruthin Road - Wrexham

Client Denbighshire County Architect

Borehole No. 7

Ground Level 292.0

Date 18.1.66

BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c. lb./sq. ft.	Ø deg.	m.c. %	γ lb./cu. ft.	N
Topsoil		1'6"	1'6"						
Soft Sandy Clay		2'6"	1'0"						
Sand and Gravel									
				10'0"					
			23'6"	I					8
				15'0"					
				I					17
				20'0"					
				I					27
				25'0"					
		26'0"		I					52

Water struck None

Final Standing Level

Undisturbed Sample ▯
Disturbed Sample o
Water Sample Δ
Penetration Test I

c = Cohesion
Ø = Angle of Internal Friction
m.c = Moisture Content
γ = Bulk Density
N = Standard Penetration Value

Water levels may be subject to seasonal or tidal variation and should not be taken as constant.

APPENDIX F
CIRIA Risk Assessment Methodology

Contaminated Land Risk Assessment

Contaminated Land Risk Assessment is a technique that identifies and considers the associated risk, determines whether the risks are significant and whether action needs to be taken. The four main stages of risk assessment are:

Hazard Identification ⇨ Hazard Assessment ⇨ Risk Estimation ⇨ Risk Evaluation

CLR11 outlines the framework to be followed for risk assessment in the UK. The framework is designed to be consistent with UK legislation and policies including planning. The starting point of the risk assessment is to identify the context of the problem and the objectives of the process. Under CLR11, three tiers of risk assessment exist - Preliminary, Generic Quantitative and Detailed Quantitative.

Formulating and developing a conceptual model for the site is an important requirement of risk assessment, this supports the identification and assessment of pollutant linkages. Development of the conceptual model forms the main part of preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process.

Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, both the likelihood and the consequences of an event must be taken into account when assessing risk.

The risk assessment process needs to take into account the degree of confidence required in decisions. Identification of uncertainties is an essential step in risk assessment.

The likelihood of an event is classified on a four-point system using the following terms and definitions from CIRIA C552:

- **High likelihood**: There is a pollution linkage and an event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution;

- **Likely**: There is a pollution linkage and all the elements are present and in the right place, which means it is probable that an event will occur. Circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term;

- **Low likelihood**: There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain even over a longer period such event would take place, and is less likely in the short term;

- **Unlikely**: There is a pollution linkage but circumstances are such that it is improbable the event would occur even in the long term.

The severity is also classified using a system based on CIRIA C552. The terms and definitions are:

- **Severe**: Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. A short-term risk to a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
  Examples – High concentrations of contaminant on surface of recreation area, major spillage of contaminants from site into controlled waters, explosion causing building to collapse;

- **Medium**: Chronic damage to human health ('significant harm' as defined in DETR 2000). Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
  Examples - Concentrations of contaminants exceed the generic assessment criteria, leaching of contaminants from a site to a Principal or Secondary Aquifer, death of species within a designated nature reserve;

- **Mild**: Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures, services or the environment;
  Examples – Pollution of non-classified groundwater or damage to buildings rendering it unsafe to occupy.

- **Minor**: harm, not necessarily significant harm, which may result in financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by use of personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.
  Examples – Presence of contaminants at such concentrations PPE is required during site work, loss of plants in landscaping scheme or discolouration of concrete.

Once the likelihood and severity have been determined, a risk category can be assigned using the table below.

		Consequences			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**Highly likely**	Very high	High	Moderate	Moderate/low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very Low	Very low

Definitions of the risk categories obtained from the above table are as follows together with an assessment of the further work that might be required:

- **Very high**: There is a high probability that severe harm could arise to a designated receptor from an identified hazard or there is evidence that severe harm is currently happening. This risk, if realised, could result in substantial liability. Urgent investigation and remediation are likely to be required;

- **High**: Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short term and are likely over the longer term;

- **Moderate**: It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it would be more likely to be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term;

- **Low**: It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild;

- **Very Low**: There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

APPENDIX G
Frequency and Duration of Gas Monitoring

Ground Gas Guidance

Redevelopment on brownfield sites is an ever increasing occurrence, including those sites where a potential ground gas issue is present.

CIRIA C665 is the current guidance which gives up-to-date advice on all aspects of ground gas. It outlines good practice in investigation, the collection of relevant data and monitoring programmes in a risk-based approach to gas contaminated land. Two semi-quantitative methods are set out for the assessment of risk:

1. For low rise housing with a ventilated under floor void at minimum 150 mm (Boyle and Witherington);
2. For all other development types (Wilson and Card).

Both methods use the concept of Gas Screening Values (GSVs) to identify levels of risk. The mitigation and management of potentially unacceptable risk is described with reference to both passive and active systems of gas. Source removal is also discussed as an option.

CIRIA C665 and the advice it contains has been prepared to be generally consistent with CLR11 *Model Procedures for the management of land contamination* (Defra and Environment Agency, 2004a). The aim of CIRIA C665 is a consistent approach to decision making, particularly relating to the scope of protective design measures on a site specific basis.

Legislative Framework

CIRIA C665 provides technical guidance however also recognises the context into which the guidance has to be employed. Government policy is based upon a "suitable for use approach", which is relevant to both the current and proposed future use of land. When considering the current use of land, Part IIA of the Environment Protection Act 1990 provides the regulatory regime. The presence of hazardous ground gases could provide the "source" in a "pollutant linkage" which could lead the regulator to determine that considerable harm or there is a significant possibility of such harm being caused. Under such circumstances, the regulator would determine the land to be "contaminated land" under the provisions of the Act, setting out the process of remediation as described in the DETR Circular 02/2000 *Statutory guidance on contaminated land* (DETR, 2000a).

Frequency and Duration of Monitoring

The monitoring period for a specific site covers the "worst case" scenario. A "worst case" scenario will occur during falling atmospheric pressure and, in particular, weather conditions such as rainfall, frost and dry weather.

The benefits of the additional information and whether it is likely to change the scope of gas protection should be considered, as are the consequences of failing to characterise adequately pollutant linkages. Investigations concerned with soil gas are required to provide monitoring data sufficient to allow prediction of worst case conditions enabling the confident assessment of risk and subsequent design of

appropriate gas protection schemes. Monitoring programmes should not be an academic exercise in data collection.

Below are matrices that will aid in determining an appropriate number of gas monitoring visits and the length of monitoring period.

Typical/idealised periods of monitoring

		Generation of Potential Source				
		Very Low	**Low**	**Moderate**	**High**	**Very High**
Sensitivity of Development	**Low (Commercial)**	1 month	2 months	3 months	6 months	12 months
	Moderate (Flats)	2 months	3 months	6 months	12 months	24 months
	High (Residential with Gardens)	3 months	6 months	6 months	12 months	24 months

Typical/idealised frequency of monitoring

		Generation of Potential Source				
		Very Low	**Low**	**Moderate**	**High**	**Very High**
Sensitivity of Development	**Low (Commercial)**	4	6	6	12	12
	Moderate (Flats)	6	6	9	12	24
	High (Residential with Gardens)	6	9	12	24	24

Note

1 NHBC guidance also recommends this period of monitoring (Boyle and Witherington, 2007).
2 There is no industry consent over "high", "medium" or "low" generation potential of source.
3 At least two sets of readings should be at low and falling atmospheric pressure (but not restricted to periods below <1000 mb) known as worst case conditions. Historical data can be used as part of the data set (Table 5.5b).

It is recommended that newly installed monitoring wells are left for 24 hours to allow the soil gas to reach equilibrium. It should be recognised, however, that some soil gas regimes could take considerably longer (up to seven days). Interpretation of any initial readings should take this equilibrium process into account.

APPENDIX H
Contaminated Land Legislative Background

Legislative Background

Environmental liabilities and risks have been evaluated in terms of a source -pathway - target relationship in accordance with the approach set out in:

- The 1995 Environment Act;
- The Contaminated Land (England) Regulations 2000;
- The DETR circular 02/2000 Environmental Protection Act 1990: Part IIA Contaminated Land.

Contaminated land is defined within the legislative framework as land which is in such condition by reason of substances in, on or under the land that:

1) Significant harm is being caused or there is a significant possibility of such harm being caused;
2) Significant pollution of controlled waters is being or is likely to be caused.

The potential for harm is based on the presence of three factors:

- **Source** - substances that are potential contaminants or pollutants that may cause harm;
- **Pathway** - a potential route by which contaminants can move from the source to the receptor;
- **Receptor** - a receptor that may be harmed, for example the water environment, humans and water.

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused. The presence of a source does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm. The nature and importance of both pathways and receptors are site specific and will vary according to the intended end use of the site, its characteristics and its surroundings.

The key principle which supports the SPR approach is 'suitable for use' criteria. This requires remedial action only where contamination is considered to pose unacceptable actual or potential risks to health or the environment and, taking into account the proposed use of the site.

Relevant Guidance Documents

This report has been prepared in accordance with the list of guidance below however the list is not exhaustive:

- CLR11 – Model Procedures;
- Contamination and Environmental Matters - Their implications for Property Professionals (2nd Edition RICS Nov 2003);
- Brownfields – Managing the development of previously developed land – A client's guide, CIRIA 2002;
- DEFRA and Environment Agency publications CLR7 – 10, supported by the TOX guides and SGV guides, dated March 2002;
- DETR Circular 02/2000, Contaminated Land: Implementation of Part IIA of the Environmental Protection Act 1990;
- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002;

Relevant Legislative Documents

The following is a non-exhaustive list of legislative framework documents that has been considered in the production of this report:

- The Environment Act (1995);
- The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012);
- The Environment Protection Act (1990);
- The Contaminated Land (England) Act (2000);
- Contaminated Land (England) Regulations (2012);
- The Water Resources Act (1991);
- The Pollution Prevention and Control (England and Wales) Regulations (2000);
- The Landfill Regulations (England and Wales) Regulations (2002);
- The Landfill (England and Wales) (Amendment) Regulations (2004);
- Health and Safety at Work Act;

APPENDIX I
Limitations

Standard Limitations

This desk study report was conducted and has been prepared for the sole internal use and reliance of the Client, Aldi Stores Limited as instructed by SWF Consulting. This report shall not be relied upon or transferred to any other parties without the express written authorisation of BSL. If an unauthorised third party comes into possession of this report they rely on it at their risk and the authors owe them no duty of care or skill.

The findings and opinions conveyed via the desk study are based on information obtained from a variety of sources as detailed within this report, which BSL believes are reliable. Nevertheless, BSL cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

Any recommendations made in this report should be confirmed with the Regulatory bodies and Planning Authority prior to implementation to ensure compliance.

No existing manhole covers were lifted or drainage runs inspected during the course of this ground investigation.

The site plans enclosed in this report should not be scaled off.